THE RELATIVE VALUE

OF

ROUND AND SAWN TIMBER

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ROUND AND SAWN TIMBER

SHOWN BY MEANS OF TABLES AND DIAGRAMS

WITH EXPLANATORY REMARKS

BY

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LAND-STEWARD AT CASTLE-FORBES

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EDINBURGH AND LONDON
MDCCCLXII

TO

THE RIGHT HON. LORD FORBES,

THIS WORK

IS VERY RESPECTFULLY INSCRIBED

BY HIS LORDSHIP'S DEVOTED HUMBLE SERVANT,

THE AUTHOR.

PREFATORY NOTE.

A DOZEN years ago, among a variety of other matters, there was committed to the Author's charge two thousand acres of plantation, the age of which ranged chiefly from thirty-five to sixty years. Till then comparatively little timber had been cut from amongst it; but its advanced state indicated that time ought not to be lost in turning it to more advantage. Having previously given most of his time and attention to other pursuits than the manufacture of wood, the Author naturally set about acquiring information on that subject from others, but soon found that many, however willing, had little to communicate, and that others, who did know something, were shy of giving him information, apparently considering that what they knew was their own secret. Further, it was evident that most parties, though conversant with some particular track, knew little beyond it. Accordingly, the Author could find no such thing as a broad system, a generally understood fundamental principle from which he could work with certainty in any given direction. He was thus led to feel that the sooner he succeeded in systematising the whole subject, the better for his employer and for himself. He also knew that before he could with

propriety profess to take the lead of others, he must not only be abreast with, but ahead of them.

Placed in those circumstances, he threw himself entirely on his own resources, carried out a series of carefully-tested experiments, storing up fact after fact till assured that he had in a measure mastered the subject. The results of those experiments, systematically arranged, are presented in this volume, now published in the belief that what the Author has found so useful to himself will be found useful and acceptable, not only to those placed in like circumstances, but to all who have an interest in such matters, whether as growers of home, or manufacturers of home or foreign timber.

CASTLE-FORBES, ABERDEENSHIRE.
20th May 1862.

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THE RELATIVE VALUE

OF

ROUND AND SAWN TIMBER.

In order to lead to a correct estimate of the value of timber in a given plantation, it is essential that the following facts be first known :—

I. The Expense of Felling;
II. The Expense of Transport;
III. The Expense of Manufacture.

These three chief heads involve minor points equally necessary to be known, and which will come up for consideration, and be treated of, each in its proper place and connection.

CHAPTER I.

THE EXPENSE OF FELLING.

This must ever vary with the rate of wages; but at the present date, when 2s. 6d. per day is considered fair wages for a woodcutter getting steady work from one employer, cutting and pruning pit prop-wood costs about 3s. 6d. per 100 trees.* Cutting and pruning

* Practice does much in this, as in everything else. We have seen a good axeman select and fell 35 to 40 dozen larches, 4 to 5 inches diameter at ground, in ten hours, and 40 to 45 dozen Scots firs in a like period; being about 6d. per 100 for the Scots firs, and 7d. for the larches.

Expense of felling per hundred trees, and per cubic foot.

trees 7 to 10 inches diameter costs 6s. to 7s. 6d. per 100; trees about 10 inches average diameter at root, 8s. to 9s. 6d. per 100. Those of larger size are found to range from $\frac{1}{12}$ to $\frac{1}{4}$ of a penny per cubic foot for felling, pruning, and cross-cutting into suitable lengths. Trees of rough, short, and thick habit, on uneven ground, and at considerable distances apart, may cost the latter sum; and where clean, straight-grown, tractable timber, of good sizes, the former. Scots fir and larch, under ordinary circumstances, cost less than spruce; the last frequently retaining a large proportion of its branches till they are rather difficult to remove. Trees are more easily felled from the standing roots than where they have been blown down by a gale of wind, or trenched over during the operation of improving the land in which they grew. When blown down, they frequently get entangled in masses, and laid awkwardly, and often a portion of the trunk is imbedded in the surface of the ground among stones and other obstructions to the operations of the cutter; besides, there is considerable risk of the most valuable part of the trunk splitting in the act of cutting, unless managed cautiously, and with some degree of tact. When trees are laid over in the act of trenching the ground, sand is apt to be thrown on the bark, thereby blunting the saw, or occasioning removal of the bark by means of an axe.

Wind-blown trees.

Before entering fully on the subject of expense of transport, it is necessary to notice the various methods of

MEASUREMENT OF ROUND TIMBER.

Various rules for measurement of timber.

RULE I. With a cord take the circumference of the tree at the middle, if it tapers regularly throughout, and in sections if it does not. After making allowance for the bark, if it has not previously been removed, the cord is folded into four equal parts for the quarter-girt; this last is multiplied by itself, and the product by the length, to find the solid content. Example:—Length of section is 12 feet, and girth, after deducting bark, 50 inches: what is the solid content? 50 in. divided by 4 is $12\frac{1}{2}$ in.; then $12\frac{1}{2}$ in. multiplied by $12\frac{1}{2}$ in. is 1 ft. 1 in. $0\frac{1}{4}$ pts.; which, multiplied by 12 ft., is $13\frac{1}{4\frac{1}{8}}$ cubic feet.

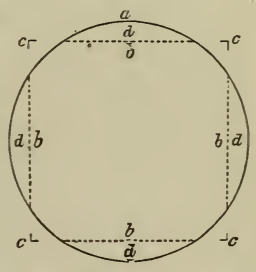
RULE II. Multiply the square of $\frac{1}{5}$ of the girth by twice the length, and the product is supposed to be the true content nearly. Example:—Length of section is 12 feet, and girth, after making allowance for bark, is 50 inches: what is the solid content? 50 in. divided by 5 is 10 in.; then 10 in. multiplied by 10 in. gives 8 in. 4 pts.; which, multiplied by 24 (twice the length), gives $16\frac{2}{3}$ cubic feet.

These two rules are distinguished throughout this work as Rule I. and Rule II. respectively. Were a section of a tree cylindrical, or even the frustum of a cone, the method of calculating its solid content by Rule I. would be erroneous in the proportion of 11 to 14 nearly; but as all trees grow more or less elliptical, the error is much less. Neither Rule I. nor Rule II. is correct, although mere theorists suppose the latter to be nearly so. In fact, the various forms which the trunks of growing trees assume are such as to set all rules together at defiance PRACTICALLY. Measurement by Rule I. has been long in use, is widely known; buyers and sellers understand each other by it; and no need has been found for a better in practice. Still, it is necessary to bear in mind that it is not accurate. This will come more prominently into view when we come to treat of the weight of timber. Fig. 1 will serve to illustrate the measurement of round timber by Rule I. A section of a tree is 12 inches long, and its girth under the bark 48 inches: what is its solid content? 48 in. ÷ 4 in. = 12 in.; then 12 in. × 12 in. = 144 in. × 12 in., gives 1 cubic foot. By Rule II. it would be fully $1\frac{1}{4}$ feet. *a*, exterior of section; *b b b b*, dotted lines marking the sides of the square, or what is included by the "quarter-girt." It will be observed that, although the small angles *c c c c* are vacant, the extra wood *d d d d*, not included in the measurement by Rule I., makes a difference of 3 feet on 11, were the section cylindrical, as already explained.

Difficulty of obtaining exact measurement.

Rule I., that commonly used in measuring round timber.

Fig. 1.



CHAPTER II.

THE EXPENSE OF TRANSPORT.

Weight rules expense of transport.

LET the means of transport be what it may, the rate of expense must ever be ruled by the weight of the timber; and there are few subjects on which ignorance prevails more generally, or to a greater extent, than on this. The statement to be found in any schoolbook, to the

"Load" of timber.

effect that 40 feet rough, or 50 feet hewn timber, is a "load," appears to have been quite satisfactory and conclusive to most parties; and when any doubt arose as to a "load" meaning a ton, it was obviated by the knowledge of the fact that spruce, larch, and Scotch fir readily float in water, and that water weighs about 62½ lb. per cubic foot. A

Illustration of general ignorance in regard to weight of timber.

rather curious case illustrative of this general ignorance recently occurred. During the contest relative to the best route for a line of railway, a plain-spoken but shrewd and honest timber-merchant, from a large town on the east coast of Scotland, was questioned before a Parliamentary Committee regarding the number of cubic feet of pine or larch in a ton. His reply was, "24 to 28 feet round timber, when the wood is young." The opposing counsel rejoined, that the witness's statement was undeserving of notice, as it was well known that it required 40 feet of timber to a ton; besides, if 24 or even 34 feet were a ton, it could not float in water, which everybody knew that it did. The honest woodman, speaking from experience, reaffirmed the truth of his assertion; and it will be shown in the course of this work whether he or the learned London lawyer was the more learned in this matter.

WEIGHT OF TIMBER.

Concentric layer, growth of one year.

The fact that the Coniferæ, in common with most other species of trees, build up their timber in concentric rings or layers, is generally known. Each of those layers is, at least in this country, beyond dispute, the growth of one year. The weight of timber in a tree is

modified in a considerable degree by the thickness of them. The thinner the layer of the pine, the lighter the wood when green, and the heavier when dry, and *vice versa*. But their thickness differs not only on different trees, but also on different sides of the same tree. So remarkably is this the case in the Norway spruce, that one side of a cross-section examined had grown for some time at the rate of 1 inch in seven years, and the other at the rate of 1 inch in two hundred years. This, however, may be regarded as an extreme case. It is by no means rare for a tree to grow more rapidly for a series of years, and more slowly during another, and frequently in the course of its life to repeat these changes. As a general rule, the nature of the soil and exposure regulate the weight of the timber grown on a given spot, and it is satisfactory to find that the number of layers or years' growths in a given piece of pine being stated, the specific gravity of the timber may be estimated with a very close approximation to certainty, if the tree, up to the time of felling, has been in a thriving state, let the soil on which it has been reared have been what it might.

Thickness of ring not uniform.

Soil, &c., regulate growth, and consequently weight.

In the larch, spruce, and Scots fir, which form the more special objects of consideration in this section of the present work, there is what is known as "heartwood" and "sapwood." The sapwood is first formed, and is that by which the alimentary matter ascends and descends, and is known by its white or light-coloured appearance, and by the exudation of sap when cut transversely while green. As the tree advances in years, the juices cease to flow through the central rings of this sapwood, and they gradually form into heartwood, at the same time assuming a brownish colour. As the tree increases in diameter, the heartwood follows on in the footsteps of the sapwood, although not quite so regularly, as a few of the concentric rings on the border form a sort of debatable land between the two, and will be found to be heartwood on one side of the tree and sapwood on the other. This heartwood is the matured part of the timber, and, having undergone a process of natural embalming, is the more durable; while the sapwood is the living, acting, and less valuable, because the less durable part. But what is more to our present purpose, the sapwood of the Coniferæ (not so of the oak) is almost uniformly heavier than the heartwood while green, and lighter when dry. This being the case, it follows, as a matter of course, that the weight of a log must vary, in various states, in proportion to its heartwood. In larch, as heartwood forms at a much earlier age than in Scots fir or Norway spruce, the weights of a log of it in the green and dry states approach each other more nearly.

Heartwood and sapwood.

Heartwood matured timber; sapwood living, acting timber.

Weight ruled by proportion of heartwood.

In order to furnish data for estimating the weight of timber, the author carried out a rather extensive series of experiments, and the results of a number of these are stated in the following Tables. It will be observed that, along with the weight, various other matters have received a share of attention. The points indicated are, (1) The allowance to be made for bark in taking the girth; (2) Weight of bark per cubic foot of timber; (3) The difference in the weight, as given by Rules I. and II.; (4) The number of cubic feet round wood to a ton, both with and without the bark; (5) The difference between the weight of the rough or round cubic foot of wood, and that of the sawn cubic foot; (6) The difference between the weight of the green and the dry scantling; (7) The weight of the green and dry heartwood; (8) The weight of the green and dry sapwood; (9) The difference between the weight of round green timber and its produce in boards in the green state, and also in the dry state.

Ends in view in making experiments.

REMARKS ON TABLE I.

The girth and age of these trees being given, the reader who desires to apply the information contained in these Tables to use in other plantations, can be at no loss for data to do so; only he must keep in view that the nearer the top of the tree, the younger the wood. The layers, or concentric rings, show only the age of the tree at the point where it is cut across. Thus, suppose a tree to have grown a foot longitudinally annually for fifty years, the base will show fifty rings, half-way to the top twenty-five, and the top itself only one. A transverse section of the above (Section I., Experiment I.) showed that the tree had grown an inch in about six years on an average, measuring from the centre to the circumference. A tree that has grown more rapidly will of itself tell that it has enjoyed richer soil, and circumstances more favourable to the development of timber; it will also be specifically heavier than the above when green, and lighter when dry. On the other hand, a tree that has been reared on soil less rich, and other circumstances less favourable, will have grown less in the same period of time, and will be found lighter while green, and heavier when dry—that is, providing all the trees have been alike healthy. In the opinion of the author, it is not necessary to be told the description of soil, &c., on which Norway spruce, Scots fir, or larch have grown, in order to form an estimate of their specific gravity. Throw down a newly-cut log, give its age and mean circumference, and it will of itself reveal all else that it is necessary to know.

Rings show age at point examined only.

Fir: the heavier when green, the lighter when dry.

TABLE I.

EXPERIMENTS with a SPRUCE FIR, Thirty-five Years PLANTED; FELLED February 19; and MEASURED, WEIGHED, and SAWN and WEIGHED as under.

EXPERIMENT I.*	Girths in inches.	Solid content. By Rule 1. ft.	in.	Solid content. By Rule 2. ft.	in.	Gross weight.	Weight per cubic foot. By Rule 1.	By Rule 2.	Number of cubic feet to a ton. By Rule 1.	By Rule 2.
						lb.	lb.	lb.		
Section I.—Cut 9 ft. long, 3 to 12 ft. from base (Feb. 19), Bark on,	40¼, 37¾, 34½	..	..	..	..	385	74	58½	30¼	38¼
Bark off,	39, 36½, 33¼	5	2 5/12	6	7	364	70	55¼	32	40½
Section II.—The 3d lineal ft. from base (Feb. 19), . . Bark on,	40½	..	..	..	..	49¼	74 2/5	59 1/10	30	38
Bark off,	39	0	7½	0	10	46	69¾	55⅕	32⅛	40½
Totals and averages, Sections I. and II., ... Bark on,	..	..	..	..	..	434⅓	74⅓	58⅘	30⅛	38⅛
Bark off,	..	6	10⅓	7	5	410	69⅞	55¼	32 1/16	40½

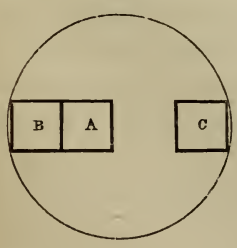
EXPERIMENT II.

Section II., on February 19, was sawn by Rule 1 and weighed, and again weighed on March 23. At this latter date a saw, cutting out 5/32 inch at each draught, was sent through it eight times. It was then weighed, and again weighed when dry, September 4. The four slabs cut off on February 19 weighed 9¼ lb. The sawing measured 2⅓ superficial feet.

Solid content. ft.	in.	pts.	WEIGHED— February 19. Gross weight.	Per cubic foot.	Cubic feet to a ton.	March 23. Gross weight.	Per cubic foot.	Cubic feet to a ton.	September 4. Gross weight.	Per cubic foot.	Cubic feet to a ton.
			lb.	lb.		lb.	lb.		lb.	lb.	
0	7	11	34¾	52 3/5	42½	27 3/16	41⅕	54⅕	..	..	..
0	6	10⅞	..	..	..	23 17/32	41	54⅗	15 5/16	27¾	80¾

EXPERIMENT III.

Fig. 2.



	Solid content. ft.	WEIGHED— February 19. Gross weight.	Per cubic foot.	Cubic feet to a ton.	March 23. Gross weight.	Per cubic foot.	Cubic feet to a ton.	September 4. Gross weight.	Per cubic foot.	Cubic feet to a ton.
		lb.	lb.		lb.	lb.		lb.	lb.	
A, all heartwood, though to a side, .	0 1 4/11	2	32	70	1 4/64	26¾	83¾	1 4/64	26¾	83¾
B, mostly sapwood, .	0 1 3/11	3 15/32	55¼	40⅕	1 7/8	30	74⅔	1 7/64	27¼	80¾
C, all sapwood, . .	0 1 3/11	3 13/16	61	36⅔	1 50/64	30¾	72¾	1¾	28	80

NOTE.—The subject of Experiment III. was the second lineal foot from base, sawn into sections, each 12 inches long, 3 by 3 inches.

* The Author begs to remark, once for all, that where small fractions of no practical importance occur, they are overlooked.

But more particularly with regard to Table I., Experiment I., this section was girthed at the base, at the middle, and at the smaller end, both above and under the bark. Taking the middle as the mean girt, the allowance for the bark was in this case only about 1 in 30, or $\frac{1}{4}$ of an inch in the quarter-girt. In the set of columns headed "solid content," the solid content of the section by both Rules is given. In that headed "gross weight," the weight of the section with the bark is given as 385 lb., and without it 364 lb. In the next column, the "weight per cubic foot" by both Rules is given,—Rule I., being that in common use, giving 74 lb. per foot with the bark, and 70 lb. without it, and showing that the bark weighed 4 lb. per cubic foot of timber. In the set of columns towards the right, it is shown that while it required only $30\frac{1}{4}$ feet by Rule I. to be a ton with bark, it required 32 feet without it. It is thus shown that where wood is carried at a rate per ton, £15, 2s. 6d. will carry it as far without the bark as £16 will do with it. Section I. was weighed on a steelyard, and Section II. by means of beam and scales. This was done for the purpose of testing the accuracy of both steelyard and calculations. There is no difference of importance in the results, but the totals and averages will be found at the foot of the respective columns.

Weight in round state.

Carriage with and without bark.

These experiments having been made with the round wood, the next point of interest was to ascertain the weight of the same wood in the manufactured state. With this object in view, Section II. was sawn in accordance with the ordinary rule of measurement—viz., by Rule I. On reference to Experiment II., it will be observed that the wood which weighed $74\frac{1}{3}$ lb. per cubic foot in the rough state, and $69\frac{7}{8}$ lb. when barked, weighed only $52\frac{2}{3}$ lb. per cubic foot when sawn into a square block representing scantlings. This great reduction arises partly from the removal of the outside slabs, composed of heavy sapwood, but chiefly from the difference between the solid content as given by Rule I., and the real solid content of the round wood. The square block, thus sawn, was placed in a position favourable for drying, and, when weighed two months after, was $41\frac{1}{8}$ lb. per cubic foot. In order to its drying still more thoroughly, it was sawn as stated on the margin, and in five months more the weight was only $27\frac{3}{4}$ lb. per foot.

Weight in manufactured state.

The results of the above experiments may be briefly stated thus:—

Rough wood, $30\frac{1}{8}$ feet 1 ton.
Squared do., green, $42\frac{1}{2}$ feet 1 ton.
Do. do., dry, $80\frac{3}{4}$ feet 1 ton.

In other words, 6d. will carry it farther in the dry (scantling) than 1s. 3d. will in the rough green state, and this exclusive of the waste by the saw-draught.

Experiment III.—It has already been remarked that sapwood and heartwood differ materially in specific gravity. This series of experiments was made for the purpose of ascertaining the difference. On reference to fig. 2, it will be observed that the timber had not formed of uniform thickness round the pith of the tree. This is uniformly the case towards the base of the spruce, Scots fir, and larch. The popular belief is, that the wood forms fastest towards the side most exposed to the light and heat of the sun's rays. Were this the case, it would prove that we have more of these from the south-east than from any other quarter. Such is not the fact, at least in Aberdeenshire. The prevailing high winds in Britain are from the north-west, and they usually blow hardest in autumn, when the young wood is most liable to be permanently bent in any given direction. This makes the top lean towards the south-east; and, by one of the many admirable compensating operations of the great Creator, the wood at the base grows fastest towards that side, so that it may act as a natural buttress, and maintain the centre of gravity.

Popular error.

Explanation of phenomenon.

In the case of the tree at present under consideration, the heartwood (Sect. A) weighed 32 lb. per cubic foot green, and only $26\frac{3}{4}$ lb. when thoroughly dry; the sapwood (Sect. C) weighed 61 lb. per foot green, and 28 lb. when dry—a reduction of considerably more than one half. When once a plant of Norway spruce gets fairly established in the ground, it grows very rapidly until it attain to something approaching to its extreme height. The centre of the tree is, from this cause, of an open, porous texture, and when dry, is thus lighter than the more compactly-grown sapwood. Sect. B was composed partly of this porous heartwood and partly of the most compact part of the sapwood; and its specific gravity when dry was the same as the squared block (Exp. II.)—viz., $80\frac{3}{4}$ cubic feet to a ton.

Rapid growth porous.

The experiments which constitute the subject of Table I. show the weight of the round tree, the squared log, the heartwood, and the sapwood. In addition, it was desirable to know the weight of timber in the form of boards, as containing a fair proportion of both heartwood and sapwood. A log was therefore provided; several sections were treated in the same manner as the foregoing; others were sawn by means of a circular saw cutting out $\frac{5}{32}$ inch at each draught, and the results of the whole form the subject of Table II.

TABLE II.

EXPERIMENTS with a SPRUCE TREE grown at HAUGHTON, Fifty Years Planted; FELLED, MEASURED, WEIGHED, and SAWN and WEIGHED, February 26; and again WEIGHED DRY, May 18.

	Girths above and below bark at intervals of two lineal feet.	IN THE ROUGH OR UNMANUFACTURED STATE.																IN THE MANUFACTURED STATE.															
		Solid content.								Gross weight.	Weight per cubic foot.		Number of cubic feet to a ton.		Inch deals.		½-inch deals.		Solid content of boards.			Gross weight of boards.		Weight of 100 sup. feet inch deals.							Number of superficial ft. in. deals to a ton.		Weight per cubic foot		Number of cubic feet to a ton.	
		By Rule 1.			By Rule 2.						By Rule 1.	By Rule 2.	By Rule 1.	By Rule 2.	Number of boards.	Superficial feet.	Number of boards.	Superficial feet.				Green.	Dry.	Green.			Dry.					Green.	Dry.			Green.	Dry.
		ft.	in.	pts.	ft.	in.	pts.	lb.	lb.	lb.									ft.	in.	pts.	lb.	lb.	cwt.	qrs.	lb.	cwt	qrs.	lb.			lb.	lb.		
Section I. Cut 12 ft. long, 3 to 15 feet from base.	Distance from base in feet, ...	3	5	7	9	11	13	15																									
	Girths in inches, Bark on,	46½	44¼	42	41¼	41	42	39¾	..	..	..	..	..	..	637	75½	59½	29⅔	37¾	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Girths in inches, Bark off,	44¾	42¾	40¾	40¼	40	41	38¾	8	5	3	10	8	4	598	70⅞	55⅞	31⅜	40	10	94	..	..	7	10	0	434	207	4	0	13⅓	1	3	24⅛	485	1017	55⅔	26⅛	40⅞	83¼
Section II. Cut 12 ft. long, 17 to 29 feet from base.	Distance from base in feet, ...	17	19	21	23	25	27	29																									
	Girths in inches, Bark on,	39½	38¾	37¾	37¾	35¾	36¼	35½	..	..	..	..	..	..	511	72⅔	57	30⅞	39⅓	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Girths in inches, Bark off,	38½	38¼	36¾	36¾	34½	35¼	34½	7	0	5	8	11	6	483	68⅔	54	32⅔	41½	8	67	1	5	5	9	6	334	152	4	1	4½	1	3	22⅝	466	1024	57⅜	26¼	38⅞	85⅛
	Totals and Averages, Secs. I. & II., Bark on,	..	..	..	..	..	..	..							1148	74⅛	58⅜	30⅛	38⅓	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Totals and Averages, Secs. I. & II., Bark off,	15	5	8	19	7	10								1081	69⅞	55	32	40⅔	18	161	1	5	13	7	6	768	359	4	0	21½	1	3	23½	477	1020½	56⅓	26⅓	40	85

TABLE III.

EXPERIMENTS with a SPRUCE TREE grown at WHITEHAUGH, Ninety Years Planted; FELLED, MEASURED, WEIGHED, and SAWN and WEIGHED, February 26; and again WEIGHED DRY, May 18.

IN THE ROUGH OR UNMANUFACTURED STATE.

	Girths above and below bark at intervals of two lineal feet.						Solid content. By Rule 1.			Solid content. By Rule 2.			Gross weight.	Weight per cubic foot. By Rule 1.	Weight per cubic foot. By Rule 2.	Number of cubic feet to a ton. By Rule 1.	Number of cubic feet to a ton. By Rule 2.
Section 9 feet long, 11 to 20 ft. from base.	Distance from base in feet,		11	13	15	17	19	ft.	in.	pts.	ft.	in.	pts.	lb.	lb.	lb.	..	..
	Girths in inches,	Bark on,	36	34½	33½	33	32¼	..	..	..	..	..	..	256	64	50	35	44⅛
		Bark off,	33½	32¼	32	31½	31	4	0	0	5	1	4¼	228	57	44½	39⅓	50⅓

IN THE MANUFACTURED STATE.

	Inch deals. Number of boards.	Inch deals. Superficial feet.	½-inch deals. Number of boards.	½-inch deals. Superficial feet.	Solid content of boards. ft.	in.	pts.	Gross weight of boards. Green. lb.	Gross weight of boards. Dry. lb.	Weight of 100 sup. feet inch deals. Green. cwt.	qrs.	lb.	Weight of 100 sup. feet inch deals. Dry. cwt.	qrs.	lb.	Number of superficial ft. in. deals to a ton. Green.	Number of superficial ft. in. deals to a ton. Dry.	Weight per cubic foot Green. lb.	Weight per cubic foot Dry. lb.	Number of cubic feet to a ton. Green.	Number of cubic feet to a ton. Dry.
Section 9 feet long, 11 to 20 ft. from base.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	8	47½	..	..	3	11	6	173	124	3	1	0	2	1	9	615	858	43⅜	31⅕	51⅓	71½

TABULAR STATEMENT OF EXPERIMENTS WITH THE HAUGHTON SPRUCE (TABLE II.) HEARTWOOD, SAPWOOD, AND AS SCANTLINGS.

N.B.—Sapwood on this tree formed a ring 3½ in. thick at base, and 2¾ in. 29 ft. up.	Solid content. ft.	in.	pts.	Gross weight. Green. lb.	Gross weight. Dry. lb.	Weight per cubic foot Green. lb.	Weight per cubic foot Dry. lb.	Number of cubic feet to a ton. Green.	Number of cubic feet to a ton. Dry.
1. A piece of Heartwood, 1 ft. 4 in. by 2⅛ in., cut from 1st to 2d foot from base of tree,	0	0	8½	$1\frac{7}{8}$	$1\frac{7}{16}$	$31\frac{3}{4}$	$24\frac{11}{12}$	70½	92
2. A piece of Heartwood, 1 ft. 3 in. by 2⅛ in., cut from 15th to 16th foot from base of tree,	0	0	$6\frac{3}{8}$	$1\frac{3}{32}$	$1\frac{5}{32}$	$37\frac{13}{32}$	$28\frac{23}{32}$	59⅞	78
3. A piece of Sapwood, 1 ft. 4 in. by 2⅛ in., cut from 1st to 2d foot from base of tree,	0	0	8½	$3\frac{1}{16}$	$1\frac{17}{32}$	$62\frac{7}{16}$	26	$35\frac{7}{8}$	$86\frac{1}{6}$
4. A piece of Sapwood, 1 ft. 3 in. by 2 in., cut from 15th to 16th foot from base of tree,	0	0	6	$2\frac{5}{8}$	$1\frac{1}{8}$	63	27	35½	83
5. A piece 2 to 3 ft. from base, girth 45 in., sawn to 1 ft. 11 in. by 11 in.,	0	10	1	$39\frac{7}{16}$	23	47	$27\frac{1}{3}$	$47\frac{7}{8}$	82
6. A piece 15 to 16 ft. from base, girth 38 in., sawn to 1 ft. 9⅛ in. by 9⅛ in.,	0	6	$11\frac{1}{4}$	$31\frac{1}{4}$	$16\frac{3}{8}$	54	$28\frac{5}{16}$	$41\frac{1}{2}$	79

TABULAR STATEMENT OF EXPERIMENTS WITH THE WHITEHAUGH SPRUCE— HEARTWOOD, SAPWOOD, AND AS SCANTLINGS.

N.B.—Sapwood on this tree formed a ring 1½ in. thick 9 ft. from base, and 1 in. 19 ft. from base.	Solid content. ft.	in.	pts.	Gross weight. Green. lb.	Gross weight. Dry. lb.	Weight per cubic foot Green. lb.	Weight per cubic foot Dry. lb.	Number of cubic feet to a ton. Green.	Number of cubic feet to a ton. Dry.
1. A piece of Heartwood, 1 ft. 4 in. by 1½ in., cut from 10th to 11th ft. from base of tree,	0	0	6	$1\frac{3}{32}$	$1\frac{5}{32}$	$32\frac{1}{8}$	$28\frac{1}{8}$	69	$79\frac{1}{2}$
2. A piece of Sapwood, 1 ft. 4 in. by 1 in., cut from 10th to 11th ft. from base of tree,	0	0	4	$1\frac{17}{64}$	$0\frac{31}{32}$	$62\frac{7}{16}$	$34\frac{7}{8}$	$35\frac{7}{8}$	$64\frac{1}{2}$
3. A piece 9 to 10 ft. from base, girth 36 in., sawn to 1 ft. 8¾ in. by 8¾ in.,	0	6	4½	21	$17\frac{5}{8}$	$39\frac{1}{2}$	$33\frac{1}{8}$	$56\frac{3}{8}$	$67\frac{3}{8}$

REMARKS ON TABLE II.

The first line of figures in the left-hand set of columns in Sections I. and II. gives the distances from the base of the tree to where the various girths were taken, and below them are the respective girths, inclusive and exclusive of bark. It will be observed that, while the allowance for bark at 3 feet from the base is $1\frac{3}{4}$ inches on $46\frac{1}{2}$, being at the rate of about 1 inch in $26\frac{1}{2}$; at 11 feet up it is 1 inch in 41; and at 29 feet it is 1 inch in $35\frac{1}{2}$. Passing down to the two lower lines, giving the totals and averages of Sections I. and II., it is seen that the gross solid content by Rule I. is 15 feet 5 inches and 8 parts, the weight of which is 1148 lb. with the bark, and 1081 lb. without it. The weight of a solid foot by Rule I. is shown to be $74\frac{1}{5}$ lb., including bark in the weight, but of course not in the measurement, and $69\frac{7}{8}$ lb. excluding bark; giving nearly $4\frac{3}{8}$ lb. of bark per cubic foot of round timber. The number of feet to a ton is $30\frac{1}{5}$ and 32 respectively.

Allowance for bark.

Turning to that part of the Table which treats of the wood in the manufactured state, it is seen that the 15 feet 5 inches 8 parts round wood, weighing 1148 lb., gave 161 superficial feet of inch boards, and 5 feet of $\frac{1}{2}$-inch, the solid content of these boards being 13 feet 7 inches and 6 parts, and the weight of them 768 lb. green, and 359 lb. dry. The round wood thus weighed 71 lb. more than three times that of the dry boards produced from it; and even after the bark was removed, it weighed 4 lb. more than three times the weight of the dry boards. Proceeding towards the right, the weight of 100 superficial feet of inch boards is shown in the green and dry states; also the number of feet, same thickness, to a ton, green and dry; and the weight of a cubic foot, green $56\frac{1}{3}$ lb., dry $26\frac{1}{3}$ lb.; giving 40 cubic feet green, and 85 cubic feet dry boards to a ton.

Weight of round timber.

Weight of boards, green and dry.

The first section of heartwood (see page 11) was from the lower part of the tree, and, being open and spongy, weighed only $31\frac{3}{4}$ lb. per cubic foot green, and $24\frac{11}{32}$ lb. dry. The second section of heartwood was from the middle of the tree, and, being more compactly grown, weighed $37\frac{13}{32}$ lb. per foot green, and $28\frac{23}{32}$ lb. dry. The section of sapwood from the lower part weighed $62\frac{7}{16}$ lb. per foot green, and 26 lb. dry; while that from the middle of the tree weighed 63 lb. per foot green, and 27 lb. dry. Taking the lower sections of heartwood and sapwood, the one was almost double the weight of the other in the green state, and this although they grew almost contiguously. Farther, although the specific gravity of the two sections of heartwood differs materi-

Weight of heartwood and sapwood.

ally, that of the two pieces of sapwood, having made like progress, corresponds closely. The square block, corresponding to scantling, taken from between the second and third foot from the base of the tree, weighs 47 lb. per foot green, and 27⅓ lb. dry. That taken from the middle is specifically heavier, containing a less proportion of the spongy heartwood, and a larger proportion of the more compact sapwood. Were wood such as that composing Sections I. and II., Table II., manufactured into inch boards where it grew, the produce would be carried off at the expense of less than 3¼ cwt.; while, if carried away in the round state, the expense would be that of 10¼ cwt. If manufactured into thinner boards, the difference would be still greater.

Weight of squared timber.

Expense of carriage.

REMARKS ON TABLE III.

The trees which formed the groundwork of Tables I. and II. grew towards the centre of rather extensive plantations—this of Table III. near the boundary-fence. The lower part of this tree exhibited symptoms of decay; a piece 10 feet long was therefore thrown aside. The differences in the girths above and under the bark are greater throughout, attributable to their different positions in the plantations. In the present case, the allowance for bark is 1 in about 14½ at 11 feet from the base, and 1 in 26 at 19 feet. The weight of the bark is 7 lb. per cubic foot round timber; 35 feet is a ton with the bark, and 39⅓ feet without it. Although the round barked timber of this aged tree weighs 12⅞ lb. less per cubic foot than that of Table II., and the green boards 12⅔ lb. per foot less, yet its dry timber weighs 6 lb. per cubic foot more than that of the younger one, the proportion of heartwood being much greater. Suppose carriage to cost 5s. per ton, the expense of transport of round wood (Table II.) would be 2d. per foot, and the dry manufactured nearly ¾d.; while the expense of this more mature timber of Table III. would be about 1¾d. per foot of round wood, and considerably over ¾d. for the dry manufactured.

Position in plantation.

Aged trees, light green and heavy dry.

Turning to the heartwood, it will be seen that it is lighter in the green state than that cut from the corresponding part of the tree of Table II., and yet is almost as heavy when both are dry. The weight of the sapwood is in both cases nearly the same. The weight of the scantlings differs widely, because, as has already been noticed, the proportion of heartwood differs widely.

The results of the experiments with these three trees may be briefly presented thus:—

	Age of tree.	Weight of bark per cubic foot, round timber.	Weight of round timber per cubic foot.		Weight of boards per cubic foot.		Weight of heartwood per cubic foot.		Weight of sapwood per cubic foot.		Weight of scantlings per cubic foot.	
			With bark.	Without bark.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.
Table	Years.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
I.	35	$4\frac{7}{16}$	$74\frac{1}{3}$	$69\frac{7}{8}$	...	...	32	$26\frac{3}{4}$	61	28	$52\frac{2}{3}$	$27\frac{3}{4}$
II.	50	$4\frac{3}{8}$	$74\frac{1}{5}$	$69\frac{7}{8}$	$56\frac{1}{3}$	$26\frac{1}{3}$	$31\frac{3}{4}$	$24\frac{11}{32}$	63	27	54	$28\frac{5}{16}$
III.	90	7	64	57	$43\frac{2}{3}$	$31\frac{1}{3}$	$32\frac{1}{2}$	$28\frac{1}{3}$	$62\frac{7}{16}$	$34\frac{7}{8}$	$39\frac{1}{2}$	$33\frac{1}{8}$

N.B.—In comparing weight of bark, keep in view the different situations in which these trees grew.

Having analysed these three Tables thus closely, it will be less necessary to be so particular with those that follow on the same subject. The reader will now be in a better position to do so for himself.

REMARKS ON TABLE IV.

Allowance for bark.

The allowance for bark in taking the girth of this Scots fir is 1 inch in $11\frac{7}{19}$ at 6 feet from the ground, and 1 in $14\frac{2}{3}$ at 12 feet; the weight of the bark $6\frac{1}{4}$ lb. and $5\frac{1}{8}$ lb. per cubic foot. The number of cubic feet round timber to a ton is $27\frac{5}{8}$ with the bark, and $29\frac{3}{4}$ without it. The weight of the square block (Exp. II.), representing scantlings or parallel-sided boards, is $58\frac{1}{4}$ lb. per cubic foot, and that of the dry wood $30\frac{7}{16}$ lb. Here the weight of the round wood by Rule II., and that of the squared wood, were nearly the same. However, had the relative proportions of heartwood and sapwood been maintained in the squared block, it would have been heavier than the round timber as calculated by Rule II. The heartwood, which weighed 37 lb. per cubic foot in the green state, lost only $3\frac{1}{2}$ lb. by drying; while the sapwood, which weighed 63 lb. green, lost $33\frac{3}{4}$ lb. by drying; and from being 26 lb. per foot heavier, became $4\frac{1}{4}$ lb. lighter. It will be observed that the allowance to be made for bark on the Scots fir is much greater than in the case of the Norway spruce. Workpeople, through inattention to this fact, generally imagine that the latter is the heavier wood in the round state.

Weight of sawn wood.

TABLE IV.

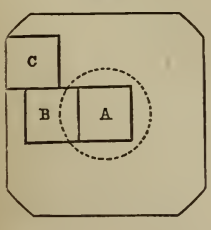
EXPERIMENTS with a SCOTS FIR, Sixty Years Planted; FELLED, MEASURED, and WEIGHED, January 18; and SAWN, MEASURED, and again WEIGHED as under.

EXPERIMENT I.		Girth in inches.	Solid content. By Rule 1. ft.	in.	Solid content. By Rule 2 ft.	in.	Gross weight.	Weight per cubic foot. By Rule 1.	By Rule 2.	Number of cubic feet to a ton. By Rule 1.	By Rule 2.
							lb.	lb.	lb.		
Section I.—Root cut 6 feet long,	Bark on,	$53\frac{3}{4}$	..	..	..	..	507	$80\frac{1}{4}$	$63\frac{3}{8}$	28	$35\frac{1}{8}$
	Bark off,	49	6	3	8	0	462	74	$57\frac{3}{4}$	$30\frac{1}{4}$	$38\frac{3}{4}$
Section II.—Cut 6 feet long, 6 to 12 feet from base, ...	Bark on,	44	..	..	..	..	359	82	$64\frac{1}{4}$	$27\frac{1}{4}$	$34\frac{3}{4}$
	Bark off,	41	4	$4\frac{1}{2}$	5	7	336	$76\frac{7}{8}$	$60\frac{7}{16}$	$29\frac{1}{8}$	$37\frac{1}{8}$
Totals and Averages, Secs. I. & II.	Bark on,	..	..	..	..	..	866	$81\frac{1}{8}$	$63\frac{13}{16}$	$27\frac{5}{8}$	$35\frac{1}{10}$
	Bark off,	..	10	$7\frac{1}{2}$	13	7	798	$75\frac{7}{16}$	59	$29\frac{3}{4}$	38

EXPERIMENT II.	Solid content. ft.	in.	pts.	WEIGHED January 18. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	March 23. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	September 4. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.
One foot cube, sawn from root end of Section I., was weighed on January 18, and on March 23. At the latter date, a saw, cutting out $\frac{5}{32}$ inch at each draught, was sent through it 10 times: it was then weighed; and again weighed, when thoroughly dry, September 4.	1	0	0	$58\frac{1}{4}$	$58\frac{1}{4}$	$38\frac{1}{2}$	$42\frac{23}{32}$	$42\frac{23}{32}$	$52\frac{4}{8}$	..	..	..
	0	10	$5\frac{1}{3}$	..	..	..	$36\frac{29}{32}$	$42\frac{23}{32}$	$52\frac{4}{8}$	$26\frac{1}{2}$	$30\frac{7}{16}$	$73\frac{1}{2}$

EXPERIMENT III.

Fig. 3.



	Solid content. ft.	WEIGHED January 18. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	March 23. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	September 4. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.
A, all heartwood, 12 by 3 by 3 in., ...	$1\frac{9}{144}$	$2\frac{5}{16}$	37	$60\frac{1}{2}$	$2\frac{5}{32}$	$34\frac{1}{2}$	65	$2\frac{3}{32}$	$33\frac{1}{2}$	$66\frac{3}{4}$
B, part heartwood and part sapwood, 12 by 3 by 3 in.,	$1\frac{9}{144}$	$3\frac{27}{64}$	$54\frac{3}{4}$	41	$2\frac{5}{64}$	$33\frac{1}{4}$	$67\frac{1}{4}$	$1\frac{31}{32}$	$31\frac{1}{2}$	$71\frac{1}{3}$
C, all sapwood, 12 by 3 by 3 in., ...	$1\frac{9}{144}$	$3\frac{15}{16}$	63	$35\frac{1}{2}$	$1\frac{7}{8}$	30	$74\frac{2}{3}$	$1\frac{53}{64}$	$29\frac{1}{4}$	$76\frac{1}{2}$

NOTE.—The subject of Experiment III. was a cut, 18 to 30 inches from base, sawn into sections. Dotted circle represents heartwood; A had grown 1 inch in $5\frac{1}{2}$ years, B and C 1 inch in 7 years.

TABLE V.

EXPERIMENTS with a SCOTS FIR Sixty Years Planted; FELLED, MEASURED, WEIGHED, and SAWN and WEIGHED, April 13; and again WEIGHED when DRY, September 4.

IN THE ROUGH OR UNMANUFACTURED STATE.

	Girths above and below bark at intervals of two feet.								Solid content. By Rule 1. ft.	in.	pts.	Solid content. By Rule 2. ft.	in.	pts.	Gross weight. lb.	Weight per cubic foot. By Rule 1. lb.	Weight per cubic foot. By Rule 2. lb.	Cubic feet to a ton. By Rule 1.	Cubic feet to a ton. By Rule 2.
Section I. A cut 12 ft. long.	Distance from root in feet,	0	2	4	6	8	10	12	..	..	..	..	..	..	..	..	..	..	..
	Girths in inches, Bark on,	12½	37¾	34½	32	31	30¼	29¾	..	..	..	..	..	..	403	90½	72	24⅛	31⅓
	Girths in inches, Bark off,	37½	33	31	29¼	28¾	28½	28¼	4	5	5	5	7	1	368	82⅔	65⅔	27	34
Section II. A cut 12 ft. long.	Distance from root in feet,	*	16	18	20	22	24	26	..	..	..	..	..	..	..	..	..	..	..
	Girths in inches, Bark on,	..	28	28	26⅔	25½	24¾	23¾	..	..	..	..	..	..	256	78⅔	60⅛	28½	37⅓
	Girths in inches, Bark off,	..	26½	26½	25½	24½	23¾	23	3	3	2	4	3	1	242	74⅐	56⅝	30⅕	39⅓
	Totals and Averages, Secs. I & II. Bark on,								..	..	..	..	..	..	659	84½	66	26⅓	34¼
	Totals and Averages, Secs. I & II. Bark off,								7	8	7	9	10	2	610	78½	61¼	28½	36⅔

IN THE MANUFACTURED STATE.

	Inch boards. Number of boards.	Inch boards. Superficial feet.	½-inch boards. Number of boards.	½-inch boards. Superficial feet.	Solid content of boards. ft.	in.	pts.	sec.	Gross weight of boards. Newly sawn. lb.	Dry. lb.	Weight of 100 sup. feet inch deals. Newly sawn. cwt.	qrs.	lb.	Dry. cwt.	qrs.	lb.	Number of superficial ft. in. deals to a ton. Newly sawn.	Dry.	Weight per cubic foot Newly sawn. lb.	Dry. lb.	Number of cubic feet to a ton. Newly sawn.	Dry.
Section I. A cut 12 ft. long.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	7	51	..	..	4	3	0	0	264	134	4	2	13½	2	1	10¾	432¾	852½	62	31½	36⅛	71⅓
Section II. A cut 12 ft. long.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	5	32¾	1	4¼	2	11	0	0	174	85	4	1	22¾	2	0	19¾	450	919	59⅔	29⅐	37½	76⅔
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	12	83¾	1	4¼	7	2	0	0	438	219	4	2	4⅛	2	1	1¼	241⅜	885¾	60⅝	30⅓	36¾	74

Notes.—(1.) The Sapwood formed a ring about 3½ inches thick at base of tree, and about 2½ inches thick at 28 feet up, and was the growth of about 35 years at the former, and 22 years at the latter point. (2.) Were Sec. I. calculated by 3 girths—viz., at 2, 6, and 10 feet—instead of the middle girth only, then the solid content by Rule I. would be 4¾ feet, and the weight with bark 84¾ lb. per cubic foot, and without it 77½ lb. per foot. By Rule II. the solid content would be 6$_{1}$½ feet, and the weight with bark 66¼ lb. per cubic foot, and without it 61⅘ lb. per foot.

* TWO BLOCKS SAWN FROM SAME TREE.

	Solid content. ft.	in.	pts.	Gross weight. Newly sawn. lb.	Dry. lb.	Weight per cubic foot Newly sawn. lb.	Dry. lb.	No. of cubic feet to a ton. Newly sawn.	Dry.
A cut from between 12 and 14 feet from base (girths at 14 feet, 28 and 27 inches), sawn to 1½ feet long, 6½ by 6½ inches, .	0	5	3½	24$_{1}$⅘	12$_{1}$⅝	55¾	28½	40⅕	78½
A cut from between 26 and 28 feet from base (girths at 28 feet, 22¾ and 21¾ inches), sawn to 1½ feet long, 5 by 5 inches, .	0	3	1½	14$_{1}$⅝	7$_{1}$⅛	55½	27⅛	40⅓	82½
Totals and Averages of two blocks, . . .	0	8	5	39$_{3}$½	19⅝	55⅝	28	40¼	80

REMARKS ON TABLE V.

The allowance for the bark of this tree is 1 inch in $11\frac{7}{12}$, at 6 feet from base, and the weight $7\frac{5}{6}$ lb. per cubic foot round timber. At 20 feet up (middle of 2d section), it is 1 inch in $21\frac{2}{3}$, and the weight about $4\frac{1}{2}$ lb.; the mean average weight being 6 lb. bark per cubic foot round timber. The same plan was pursued with this tree as with those of Tables II. and III., in order to demonstrate the weight of the whole timber as boards, and with small sections representing that of scantlings and parallel-sided boards. A wide difference is observable in the weight of the round timber of Sections I. and II. as given in the Table. This is farther noticed in the marginal note. It arises from the rapidly-tapering form of the tree from the base to 6 feet up, the point at which the girth is taken.

Weight of bark.

Difference observable.

The average weight of that part of the tree sawn into boards is $60\frac{5}{8}$ lb. per cubic foot green, and $30\frac{1}{3}$ lb. dry; while the weight of the squared sections is $55\frac{5}{8}$ lb. green, and 28 lb. dry. The heartwood, having grown more rapidly than that which was the sapwood at the time of felling the tree, was softer and lighter.

REMARKS ON TABLE VI.

Perhaps no one of all these Tables brings out more clearly than this the various objects for which they were constructed; it will therefore be made the subject of fuller remark. In taking the girth of a standing tree in passing through a plantation, one is very apt to do so at about 6 feet from the ground. In this case the allowance for bark at this point is $4\frac{1}{2}$ inches on the entire girth, being about 1 in $10\frac{1}{2}$. At 20 feet up it is 1 in a little over 26, and at 40 feet it is 1 in 27. The weight of the bark is $7\frac{1}{4}$ lb., 5 lb., and $4\frac{1}{3}$ lb. per foot on the respective sections, and the mean average $5\frac{1}{2}$ lb. per cubic foot round timber. For the purpose of affording data for comparing any given part of a tree with its other parts, as well as with other trees, this, in common with several others, was cut into sections, and each treated independently. The mean averages will be found in the base lines.

Facts to be more particularly observed.

Here the gross weight of Sections I., II., and III., in the rough state, was 1900 lb.; but on the bark being removed it was 1770 lb. These sections were cut into boards, by means of a circular saw cutting out $\frac{5}{32}$ inch at each draught. In order to turn as much as possible out of them, the outsides were sawn $\frac{1}{2}$ inch thick, and the

Weight of round timber.

TABLE VI.

EXPERIMENTS with a SCOTS FIR Sixty Years Planted; FELLED, MEASURED, WEIGHED, and SAWN and WEIGHED, April 13; and again WEIGHED when DRY, September 4.

	Girths above and below bark at intervals of two lineal feet.	IN THE ROUGH OR UNMANUFACTURED STATE.																IN THE MANUFACTURED STATE.																	
		Solid content.										Gross weight.	Weight per cubic foot.		Cubic feet to a ton.		1inch boards.		¼-inch boards.		Solid content of boards.		Gross weight of boards.		Weight of 100 sup. ft. inch deals.				Number of superficial ft. in deals to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.	
		By Rule 1.			By Rule 2.												Number of boards.	Superficial feet.	Number of boards.	Superficial feet.					Newly sawn.		Dry.				Newly sawn.	Dry.	Newly sawn.	Dry.	Newly sawn.	Dry.
		ft	in.	pts.	ft.	in.	pts.					lb.	lb.	lb.							ft.	in.	pts.	sec.	lb.	lb.	cwt.	qrs.	lb.	cwt.	qrs.	lb.			lb.	lb.		
Section I. A cut 12 ft. long.	Distance from root in feet,	0	2	4	6	8	10	12																											
	Girths in inches, Bark on,	53¼	51¼	48½	47½	46¼	43½	44				806	83½	65¼	26¾	34¼																			
	Girths in inches, Bark off,	47¾	45¾	43½	43	41¾	41	41½	9	7	6	738	76⅛	59¾	29¼	37½	10	106⅛	sec.	4	9	11	6	0	541	274	4	1	22⅝	2	1	01⅝	449⅛	887	59¾	30⅛	37½	74
Section II. A cut 12 ft. long.	Distance from root in feet,	*	16	18	20	22	24	26																											
	Girths in inches, Bark on,		43½	43½	40¼	41	40⅝	37½				642	82⅛	65⅛	27⅛	34⅝																			
	Girths in inches, Bark off,		41¼	41	38⅜	39⅞	37⅛	36	7	9	5	9	9	6	604	77⅛	61⅛	29	36⅛	9	88	1	6	7	7	6	11	436	214	4	0	24⅛	2	0	11⅛	474	953	56⅜	28½	39½	79
Section III. A cut 12 ft. long.	Distance from root in feet,	*	30	32	34	36	38	40																											
	Girths in inches, Bark on,		38¼	36¼	34	29¾	28½	27				453	83½	65⅞	26⅞	34																			
	Girths in inches, Bark off,		36¾	34½	32½	28¾	27	26	5	5	0	6	10	4	428	79	62⅛	28⅛	36	0¾	52½	..	..	4	4	3	6	275	127	4	2	17⅛	2	0	19	429⅛	921¾	63½	29½	35½	76¾
	Totals and averages, Sections I., II., and III., Bark on,											1900	83⅛	65⅝	27	34⅛																			
	Totals and averages, Sections I., II., and III., Bark off,								22	9	11	1770	77⅜	61⅛	29	36⅞	25⅔	246⅔	1⅜	16	20	11	9	0	1246	615	4	1	18⅜	2	0	20	452½	918	59½	29½	37¾	75½

* TWO BLOCKS SAWN FROM SAME TREE.

	Solid content.			Gross weight.		Weight per cubic foot.		No. of cubic feet to a ton.	
				Newly sawn.	Dry.	Newly sawn.	Dry.	Newly sawn.	Dry.
	ft	in	pts.	lb.	lb.	lb.	lb.		
A cut from between 12 and 14 feet from base (girths at 14 feet, 42¼ and 40 inches), sawn to 4½ feet long, 10 by 10 inches,	1	11	6	56⅛⅛	32⅛	54⅛	31⅛	41⅛	71⅞
A cut from between 26 and 28 feet from base (girths at 28 feet, 36⅛ and 35¼ inches), sawn to 4½ feet long, 8 by 8 inches,	0	8	6	38⅜⅛	19⅛	57⅞	29⅛	39	76⅛
Averages and totals of two blocks,	1	8	6	95⅛⅛	52	55⅝	30⅛	40¼	73⅛

NOTES.—(1.) The upper half of this tree was knotty and irregular. (2.) The first block, while green, was submerged in water for 60 hours, and its weight rose from 56⅛⅛ lb. to 58⅛ lb. (3.) The sapwood composed a ring about 4½ inches thick at base of tree, and 3 inches thick 40 feet up, and was the growth of about 35 years at the former, and 15 years at the latter point.

rest into inch boards: thus nothing was lost but what was absolutely necessary in the saw-draught, and the waste slabs on the outside; yet the 1900 lb. rough timber immediately fell to 1246 lb. in boards; and these boards, on being dried, weighed only 615 lb. By carrying off the round tree, 1900 lb. had to be transported; by manufacturing on the spot, its produce in dry boards fell to very considerably less than one-third of that weight. In thinner boards entirely, the difference, as a matter of course, would have been still greater, as more of it would have been waste by the saw-draught. Even in the case of the boards alone, 452½ superficial feet, green, weighed a ton, while it took 918 feet of them to do so dry.

Weight of dry boards.

The rough wood, including as usual the bark in the weight, but not in the measurement, weighed 83⅛ lb. per foot, the green wood in the boards 59⅓ lb., and the dry boards 29⅓ lb. per cubic foot. While the mean average weight of board-wood was 59⅓ lb. green, and 29⅓ lb. dry, that of the squared timber was 55⅔ lb. green, and 30½ lb. dry. This difference is in consequence of the greater part of the sapwood continuing in the boards along with that of the heartwood. From the squared timber the sapwood exclusively was cut off in the operation of squaring. Had a square piece been taken from the base of the tree, doubtless it would have been lighter both in the green and dry states, as it would have been originally of quicker growth, and more spongy, and by the time the tree was felled the central portion would have been comparatively dry. This tree and that of Table V. grew almost side by side upon a dry rocky hillock.

Comparative weight of entire tree and squared timber.

REMARKS ON TABLE VII.

The allowance for bark is 1 in 12½ at 6 feet from base, and 1 in 12⅔ at 20 feet. The weight of the bark is 6 lb. per foot at the former point, and 5 lb. at the latter, the average being about 5½ lb. per cubic foot rough timber. This Table brings out in a very marked manner the difference between the middle-aged timber of 60 years planted and that of mature growth. This wood, the produce of a tree 100 years planted, as compared with that of Table VI., is 8 lb. per cubic foot lighter in the round state, about 5⅛ lb. lighter in the manufactured green state, and 3½ lb. *heavier* when dry. The squared timber also is 6⅔ lb. lighter when green, and 2 lb. heavier when dry. This tree also grew on a dry rocky hillock.

Additional particulars regarding the weight of timber of a wider variety of ages will be found farther on in this work.

TABLE VII.

EXPERIMENTS with a SCOTS FIR 100 Years Planted; Felled, Measured, Weighed, and Sawn and Weighed, April 13; and again Weighed when Dry, September 4.

IN THE ROUGH OR UNMANUFACTURED STATE.

	Girths above and below bark at intervals of two lineal feet.								Solid content. By Rule 1.			Solid content. By Rule 2.			Gross weight.	Weight per cubic foot. By Rule 1.	Weight per cubic foot. By Rule 2.	Cubic feet to a ton. By Rule 1.	Cubic feet to a ton. By Rule 2.
									ft.	in.	pts.	ft.	in.	pts.	lb.	lb.	lb.		
Section I. A cut 12 ft. long.	Distance from root in feet,	0	2	4	6	8	10	12											
	Girths in inches, Bark on,	61	55	51¼	50½	48½	49	45½	..	..	..	..	..	..	856	76	60	29½	36⅞
	Girths in inches, Bark off,	57	50	47	46½	45	45¼	42½	11	3	1	14	3	3	788	70	55⅛	32	40½
Section II. A cut 12 ft. long.	Distance from root in feet,	*	16	18	20	22	24	26	..	..	..	..	..	..	..	..	..	..	..
	Girths in inches, Bark on,		43¼	42⅜	41½	42¼	37	36	..	..	..	..	..	..	553	74⅛	57⅜	30½	38¾
	Girths in inches, Bark off,		40¼	39½	38	40	34½	34	7	5	3	9	7	0	515	69⅛	53⅜	32⅛	41⅞
	Totals and Averages, Secs. I. and II. Bark on,								..	..	..	..	..	..	1409	75⅛	58⅛	29⅞	37½
	Totals and Averages, Secs. I. and II. Bark off,								18	8	4	23	10	3	1303	69⅜	54½	32⅛	41⅛

IN THE MANUFACTURED STATE.

	Inch boards. Number of boards.	Inch boards. Superficial feet.	¼-inch boards. Number of boards.	¼-inch boards. Superficial feet.	Solid content of boards. ft.	in.	pts.	sec.	Gross weight of boards. Newly sawn.	Gross weight of boards. Dry.	Weight of 100 sup. feet inch deals. Newly sawn.	Dry. cwt.	Dry. qrs.	Dry. lb.	Number of superficial ft. in. deals to a ton. Newly sawn.	Number of superficial ft. in. deals to a ton. Dry.	Weight per cubic foot Newly sawn.	Weight per cubic foot Dry.	Number of cubic feet to a ton. Newly sawn.	Number of cubic feet to a ton. Dry
									lb.	lb.	cwt.						lb.	lb.		
Section I. A cut 12 ft. long.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	10	123½	1½	9	10	8	0	0	595	365	4	0	16¾	2	2	5½	482	785½	55¾	34¼	40⅛	65⅛
Section II. A cut 12 ft. long.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	9⅜	87¾	⅜	3¾	7	5	7	6	392	235	3	3	17½	2	1	7½	512	863⅛	52½	31½	42⅞	71½
	19⅜	211¼	2⅛	12¾	18	1	7	6	937	600	4	0	3½	2	1	20	497	824½	54⅛	32⅞	41½	68⅝

* TWO BLOCKS OF WOOD SAWN FROM SAME TREE.

	Solid content. ft.	in.	pts.	Gross weight. Newly sawn.	Gross weight. Dry.	Weight per cubic foot Newly sawn.	Weight per cubic foot Dry.	No. of cubic feet to a ton. Newly sawn.	No. of cubic feet to a ton. Dry
				lb.	lb.	lb.	lb.		
A cut from between 12 and 14 feet from base (girths at 14 feet, 45 and 42½ inches), sawn to 1½ feet long, 10 by 10 inches, .	1	0	6	$50\frac{5}{16}$	34½	48½	33⅛	46⅛	67½
A cut from between 26 and 28 feet from base (girths at 28 feet, 36¾ and 35 inches), sawn to 1½ feet long, 8 by 8 inches, . .	0	8	0	$33\frac{9}{16}$	21¼	50⅛	31⅞	44⅛	70⅛
Totals and averages of two blocks, . . .	1	8	6	83¾	55¼	49	32⅛	45⅞	69

Notes.—(1.) The upper end of this tree, including part of Section II., was knotty and irregular. (2.) The sapwood formed a ring about 3½ inches thick at base, and about 2 inches at 28 feet up, and was the growth of about 60 years at the former and about 40 years at the latter. (3.) The first-noted of the blocks, while green, was submerged in water 60 hours, the weight then rose from $50\frac{5}{16}$ lb. to 52¼ lb. The quantity of boards produced from this old tree was large in comparison with its size.

TABLE VIII.

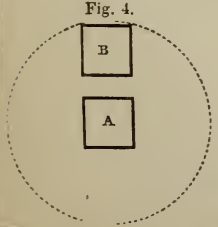
EXPERIMENTS with a LARCH TREE Sixty Years Planted; FELLED, MEASURED, and WEIGHED, Feb. 19; and SAWN, MEASURED, and again WEIGHED as under.

EXPERIMENT I.		Girths in inches.	Solid content. By Rule 1. ft.	in.	Solid content. By Rule 2. ft.	in.	Gross weight. lb.	Weight per cubic foot. By Rule 1. lb.	oz.	By Rule 2. lb.	oz.	Number of cubic feet to a ton. By Rule 1.	By Rule 2.
Section I.—Second lineal foot from base,	Bark on,	$52\frac{3}{8}$	..	..	..	..	$68\frac{3}{4}$	68	12	53	12	$32\frac{1}{2}$	$41\frac{3}{4}$
	Bark off,	48	1	0	1	$3\frac{1}{8}$	$60\frac{1}{2}$	60	8	47	5	$37\frac{1}{8}$	$47\frac{1}{4}$
Section II.—A cut 12 ft. long, 3 to 15 ft. from base,	Bark on,	$50\frac{1}{2}$, 44, $39\frac{1}{2}$	..	..	..	..	599	70	2	54	13	32	$40\frac{3}{4}$
	Bark off,	47, $40\frac{1}{2}$, $36\frac{1}{2}$	8	$6\frac{1}{2}$	10	11	530	62	0	48	8	$36\frac{1}{8}$	46
Section III.—Sixteenth lineal foot from base,	Bark on,	$39\frac{3}{4}$	..	..	..	..	$39\frac{1}{4}$	69	12	54	9	$32\frac{1}{8}$	41
	Bark off,	36	0	$6\frac{3}{4}$	0	$8\frac{15}{24}$	35	62	4	48	11	36	46
Section IV.—Seventeenth lineal foot from base,	Bark on,	38	..	..	..	..	$38\frac{1}{4}$	74	0	57	6	$30\frac{1}{4}$	39
	Bark off,	$34\frac{3}{4}$	0	$6\frac{1}{8}$	0	8	34	65	12	51	0	34	44
Section V.—A cut 12 ft. long, 17 to 29 feet from base,	Bark on,	38, 34, $29\frac{1}{2}$	..	..	..	..	364	70	8	55	0	$31\frac{3}{4}$	$40\frac{3}{4}$
	Bark off,	$34\frac{1}{2}$, $31\frac{1}{2}$, $26\frac{1}{2}$	5	2	6	$7\frac{1}{4}$	326	63	0	49	4	$35\frac{1}{2}$	$45\frac{1}{2}$
Totals and Averages, Sects. I., II., III., IV., & V.,	Bark on,	..	..	..	..	..	$1109\frac{1}{4}$	70	10	55	$1\frac{1}{2}$	$31\frac{3}{4}$	$40\frac{3}{8}$
	Bark off,	..	15	$9\frac{4}{8}$	20	$2\frac{1}{4}$	$985\frac{1}{2}$	62	11	48	15	$35\frac{3}{4}$	$45\frac{3}{4}$

	Solid content. ft.	in.	pts.	sec.	WEIGHED February 19. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	March 23. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	September 4. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.
EXPERIMENT II.—Section I. sawn to 1 ft. long, 12 by 12 in., weighed February 19th, and March 23d. At this last date, a saw, cutting out $\frac{5}{32}$ in., was sent through it 10 times: it was then weighed; and again weighed, when thoroughly dry, September 4.	1	0	0	0	$43\frac{1}{4}$	$43\frac{1}{4}$	$51\frac{3}{4}$	$35\frac{1}{2}$	$35\frac{1}{2}$	63	..	..	..
	0	10	5	4	..	..	..	$30\frac{10}{16}$	$35\frac{3}{16}$	$63\frac{3}{8}$	$26\frac{1}{16}$	$29\frac{15}{16}$	$74\frac{4}{8}$
EXPERIMENT III.—Section III. treated in the same way as Section I., the saw being sent through it seven times.	0	6	9	0	25	$44\frac{1}{4}$	$50\frac{1}{2}$	$20\frac{1}{16}$	$35\frac{3}{8}$	$62\frac{3}{8}$	..	..	..
	0	5	11	3	..	..	..	$17\frac{1}{2}$	$35\frac{1}{2}$	$63\frac{1}{10}$	$14\frac{13}{32}$	$29\frac{15}{32}$	76
Totals and Averages of Experiments II. & III.,	1	6	9	0	$68\frac{1}{4}$	$43\frac{3}{4}$	$51\frac{3}{14}$	..	$35\frac{7}{12}$	$62\frac{5}{8}$	$40\frac{31}{32}$	$29\frac{3}{64}$	$75\frac{2}{8}$

EXPERIMENT IV.—Section IV. sawn into sections each 12 in. 3 by 3 in., as under,—

Fig. 4.



A, all heartwood, . .
B, part heartwood and part sapwood, .

	Solid content. ft.	WEIGHED February 19. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	March 23. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.	September 4. Gross weight. lb.	Per cubic foot. lb.	Cubic feet to a ton.
A	$1\frac{9}{144}$	$2\frac{7}{32}$	35	64	2	32	70	$1\frac{31}{32}$	$31\frac{1}{2}$	71
B	$1\frac{9}{144}$	3	48	$46\frac{2}{3}$	$2\frac{5}{32}$	$34\frac{1}{2}$	65	$2\frac{1}{32}$	$32\frac{1}{2}$	69

REMARKS ON TABLE VIII.

Allowance for larch bark.

The allowance for bark is about 1 in 12 at second foot from base, 1 in $12\frac{1}{2}$ at eighth foot, 1 in about $11\frac{3}{4}$ at seventeenth foot, and 1 in $13\frac{3}{5}$ at twenty-third foot. The weight of the bark varies only slightly throughout, being about an average of 8 lb. per foot of round timber, and $2\frac{1}{4}$ cwt. per ton. The average weight of the rough timber was $70\frac{5}{8}$ lb. per foot, and of the squared timber, representing scantlings and parallel-sided boards, $43\frac{3}{4}$ lb. green, and $29\frac{3}{4}$ lb. dry. The weight of the heartwood was 35 lb. per foot green, and $31\frac{1}{2}$ lb. dry; while the section from the outside was 48 lb. green, and $32\frac{1}{2}$ lb. dry. The sapwood continued heaviest, being more compactly grown than the heartwood at the same place. The four slabs (Exp. II.) weighed $14\frac{1}{2}$ lb., the sawing measured 3 superficial feet, the sawdust weighed $2\frac{3}{4}$ lb., being $14\frac{2}{3}$ oz. per superficial foot sawing. The four slabs (Exp. III.) weighed 8 lb. on 19th February, 3 lb. $15\frac{1}{2}$ oz. on 23d March, and 3 lb. 11 oz. on 4th September. The sawing of them measured $2\frac{1}{6}$ superficial feet.

Weight of green and dry larch.

Weight of sawdust.

REMARKS ON TABLE IX.

The allowance for bark is 1 in $10\frac{2}{3}$ at 6 feet from the base, 1 in $14\frac{2}{5}$ at 20 feet, and 1 in almost 16 at 40 feet. The weight of the bark is about $7\frac{1}{8}$ lb. per cubic foot rough timber at the first, $6\frac{1}{2}$ lb. at the second, and $6\frac{1}{3}$ lb. at the third point; the mean average being 7 lb. per foot, or fully one-tenth of the gross weight. The weight of the green boards and that of the green blocks approach closely, and their weight dry still more so. This arises from the larch forming heartwood at an early stage of its growth, as compared with the Norway spruce or Scots fir. While the sapwood of this larch formed a ring 2 inches thick at the base, and $1\frac{1}{2}$ at 42 feet up, it was $4\frac{1}{2}$ inches at the base of the Scots fir of Table VI., and 3 inches at 40 feet up; although both trees were of one age, one diameter almost, grew side by side, and were equally healthy. *Vide* marginal notes.

Small proportion of sapwood in larch.

TABLE IX.

EXPERIMENTS with a LARCH TREE Sixty Years Planted; FELLED, MEASURED, WEIGHED, and SAWN and WEIGHED, April 13; and again WEIGHED when DRY, September 4.

IN THE ROUGH OR UNMANUFACTURED STATE.

Girths above and below bark at intervals of two feet.									Solid content. By Rule 1. ft.	in.	pts.	Solid content. By Rule 2. ft.	in.	pts.	Gross weight. lb.	Weight per cubic foot. By Rule 1. lb.	Weight per cubic foot. By Rule 2. lb.	Cubic feet to a ton. By Rule 1.	Cubic feet to a ton. By Rule 2.
Section I. A cut 12 ft. long.	Distance from root in feet,	0	2	4	6	8	10	12											
	Girths in inches, Bark on,	53¼	45	42¼	41¼	40¼	40	39⅛							534	69⅜	54⅝	32	41¼
	Girths in inches, Bark off,	49¾	42½	39¼	38⅜	37½	37	36⅛	7	8	0	9	9	9	479	62½	48¾	35⅘	46
Section II. A cut 12 ft. long.	Distance from root in feet,	*	16	18	20	22	24	26											
	Girths in inches, Bark on,		37½	37½	36½	35⅜	35½	34½							392	65	51	34½	44
	Girths in inches, Bark off,		35¼	35	34	33½	33¼	32	6	0	3	7	8	5	352	58½	45¾	38¼	49
Section III. A cut 12 ft. long.	Distance from root in feet,	*	30	32	34	36	38	40											
	Girths in inches, Bark on,		33	31½	30½	30½	28⅜	27¾							292	69	54	32½	41½
	Girths in inches, Bark off,		30¾	29¼	28½	28¼	26⅜	26	4	2	9	5	4	10	265	62⅜	49	35¾	45⅜
Totals and Averages, Sections I., II., and III.,	Bark on,														1218	68	53	33	42¼
	Bark off,								17	11	0	22	11	0	1096	61	47¾	36⅜	47

IN THE MANUFACTURED STATE.

	Inch boards. Number of boards.	Inch boards. Superficial feet.	½-inch boards. Number of boards.	½-inch boards. Superficial feet.	Solid content of boards. ft.	in.	pts.	Gross weight of boards. Newly sawn. lb.	Gross weight of boards. Dry. lb.	Weight of 100 sup. ft. inch deal. Newly sawn. cwt.	qrs.	lb.	Weight of 100 sup. ft. inch deal. Dry. cwt.	qrs.	lb.	Number of superficial ft. in. deals to a ton. Newly sawn.	Number of superficial ft. in. deals to a ton. Dry.	Weight per cubic foot. Newly sawn. lb.	Weight per cubic foot. Dry. lb.	Number of cubic feet to a ton. Newly sawn.	Number of cubic feet to a ton. Dry
Section I. A cut 12 ft. long.																					
Section II. A cut 12 ft. long.																					
Section III. A cut 12 ft. long.																					
Totals and Averages, Sections I., II., and III.,	23	199¼	2	10¾	17	0	7½	764	488	3	1	9½	2	0	14½	599½	939	44¾	28⅜	50	78⅛

NOTE.—(1.) The sapwood composed a ring about 2 inches thick at base of tree, and 1½ inch thick at 42 feet up, and was the growth of about 17 years at the former, and 13 years at the latter, point.

* THREE BLOCKS SAWN FROM SAME TREE.

	Solid content. ft.	in.	pts.	Gross weight. Newly sawn. lb.	Gross weight. Dry. lb.	Weight per cubic foot. Newly sawn. lb.	Weight per cubic foot. Dry. lb.	No of cubic feet to a ton Newly sawn.	No of cubic feet to a ton Dry.
A cut from between 12 and 14 feet from base (girths at 14 feet, 38½ and 36¼ inches), sawn to 1⅛ feet long. 8¼ by 8⅛ inches, .	0	9	0 4½″	28⅞	21⅞	37½	28¼	59⅜	78¼
A cut from between 26 and 28 feet from base (girths at 28 feet, 33 and 31¼ inches), sawn to 1½ feet long, 7¼ by 7⅛ inches, .	0	7	0.4½″	23⅛	16⅜	39¾	28	56⅛	80
A cut from between 40 and 42 feet from base (girths at 42 feet, 26 and 24¼ inches), sawn to 1½ feet long, 5½ by 5½ inches, .	0	3	9.4½″″	13⅞	8⅛	43⅞	28¼	51	79
Totals and averages of blocks, . . .	1	7	10.1½″″	65⅛	46¾	39½	28¼	56⅜	79

TABLE X.

EXPERIMENTS with a LARCH TREE Sixty Years Planted; Felled, Measured, Weighed, and Sawn and Weighed, April 13; and again Weighed when Dry, September 4.

IN THE ROUGH OR UNMANUFACTURED STATE.

	Girths above and below bark at intervals of two feet.								Solid content. By Rule 1.			Solid content. By Rule 2.			Gross weight.	Weight per cubic foot. By Rule 1.	Weight per cubic foot. By Rule 2.	Cubic feet to a ton. By Rule 1.	Cubic feet to a ton. By Rule 2.
									ft.	in.	pts.	ft.	in.	pts.	lb.	lb.	lb.		
Section I. A cut 12 feet long.	Distance from root in feet,	0	2	4	6	8	10	12	..	..	..	..	..	..	..	..	..	..	..
	Girths in inches, Bark on,	43½	39	34	32½	31	31	30½	..	..	..	..	..	..	371	82	64	27¼	35
	Girths in inches, Bark off,	39	34	30¾	29½	28½	28	27½	4	6	4	5	9	6	328	72⅜	56⅝	31	39⅝
Section II. A cut 12 feet long.	Distance from root, in feet,	*	16	18	20	22	24	26	..	..	..	..	..	..	..	..	..	..	..
	Girths in inches, Bark on,		29¾	28¾	29	27¾	26¾	26½	..	..	..	..	..	..	256	72⅛	57	30⅞	39½
	Girths in inches, Bark off,		27	26	26	25	24¼	24¼	3	6	3	4	5	10	228	64⅜	50⅜	34⅜	44
	Totals and Averages, Secs. 1 & II., Bark on,								..	..	..	..	..	..	627	77⅛	61	28¾	36⅜
	Totals and Averages, Secs. 1 & II., Bark off,								8	0	7	10	3	4	556	69	54 1/16	32½	41⅞

IN THE MANUFACTURED STATE.

	Inch boards. Number of boards.	Inch boards. Superficial feet.	¼-inch boards. Number of boards.	¼-inch boards. Superficial feet.	Solid content of boards. ft.	in.	pts.	Gross weight of boards. Newly sawn. lb.	Dry lb.	Weight of 100 sup. feet inch deals. Newly sawn. cwt.	qrs.	lb.	Dry. cwt.	qrs.	lb.	Number of superficial ft. in. deals to a ton. Newly sawn.	Dry.	Weight per cubic foot Newly sawn. lb.	Dry. lb.	Number of cubic feet to a ton. Newly sawn.	Dry.
Section I. A cut 12 feet long.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	7½	51¾	..	..	4	3	9	238	174	4	0	12	3	0	0	487	666	55⅛	40⅛	40⅝	55½
Section II. A cut 12 feet long.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	5	31	1	5	2	9	6	145	103	3	3	13	2	3	0	517	728	52	37	43	60½
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	12½	82¾	1	5	7	1	3	383	277	4	0	1	2	3	17	499	689	54	39	41½	57⅝

* TWO BLOCKS SAWN FROM SAME TREE.

	Solid content. ft.	in.	pts.	sec.	Gross weight. Newly sawn. lb.	Dry. lb.	Weight per cubic foot Newly sawn. lb.	Dry. lb.	No. of cubic feet to a ton. Newly sawn.	Dry
A cut from between 12th and 14th foot from base (girths at 14 ft., 29½ and 26¾ in.), sawn to 1½ ft. long, 6½ by 6½ inches, .	0	5	3	4½	20⅜	15 1/32	46¼	35 3/32	48⅘	63
A cut from between 26th and 28th foot from base (girths at 28 ft., 26¼ and 23¾ in.), sawn to 1½ ft. long, 5 by 5 inches, . .	0	3	1	6	11 1/16	8⅞	45 1/32	34 1/16	49	65¼
Totals and Averages of two blocks, . . .	0	8	4	10½	32 5/16	24 1/32	46⅛	34 3/32	48½	64⅛

Note.—(1.) The sapwood formed a ring of nearly uniform thickness, 1 inch, and was the growth of about 17 years at the base, and about 14 years 28 feet up.

REMARKS ON TABLE X.

This tree and that of Table IX. grew within a few yards of each other, and before they were felled they appeared alike healthy; yet the differences in the weight of their timber are very remarkable—so much so, that a person taking a merely cursory glance at the subject would feel quite at a loss how to account for it. The apparent mystery admits of a simple and satisfactory explanation. The allowance for the bark is 1 in $10\frac{5}{6}$ at 6 feet from the base, and 1 in $9\frac{3}{5}$ at 20 feet. The weight is $9\frac{3}{5}$ lb. per cubic foot rough timber in Section I., and 8 lb. in Section II.; the mean average being almost 9 lb. per foot. On comparing the timber of Table X. with that of Table IX., it will be found that of the former the rough log is $9\frac{10}{11}$ lb. per cubic foot heavier; without the bark, 8 lb. heavier; the green boards $9\frac{1}{4}$ lb., and the dry boards $10\frac{2}{3}$ lb. per cubic foot heavier. The ground of difference is this: larch forms early into heartwood, which is naturally half dry, even while the tree is in active growth. Both these trees were mostly composed of it; but that of Table IX. was of quick growth, consequently porous and light, compared with the compactly-built timber of Table X.

Heartwood naturally half dry.

All the larch of the foregoing experiments was of the red kind.

For the purpose of furnishing greater facilities for comparing with one another the experiments which form the groundwork of these ten Tables, Table XI. has been constructed; and additional remarks founded on them, and on additional experiments, will be found farther forward in this work.

Note.—For the grounds of difference, see the Remarks on the various Tables.

TABLE XI.

SYNOPSIS OF TABLES I. TO X.

Species of Tree.	IN THE ROUGH OR UNMANUFACTURED STATE.									IN THE MANUFACTURED STATE.												
	Number of Table.	Number of years planted.	Weight per cubic foot.				Number of cubic feet to a ton.			Inch boards.				Scantlings.				Heartwood.				Sapwood.			
			By Rule 1.		By Rule 2.		By Rule 1.		By Rule 2.	Weight per cubic foot.		Number of cubic feet to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.	
			Bark on	Bark off	Bark on	Bark off	Bark on	Bark off	Bark on	Bark off	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.
			lb.	lb.	lb.	lb.					lb.	lb.			lb.	lb.			lb.	lb.			lb.	lb.		
Spruce	I.	35	$74\frac{1}{8}$	$69\frac{7}{8}$	$58\frac{4}{8}$	$55\frac{1}{4}$	$30\frac{1}{8}$	$32\frac{1}{16}$	$38\frac{1}{8}$	$40\frac{1}{2}$	..	..	..	..	$52\frac{3}{4}$	$27\frac{3}{4}$	$42\frac{1}{2}$	$80\frac{3}{4}$	32	$26\frac{3}{4}$	70	$83\frac{3}{4}$	61	28	$36\frac{3}{8}$	80
	II.	50	$74\frac{1}{8}$	$69\frac{7}{8}$	$58\frac{3}{8}$	55	$30\frac{1}{8}$	32	$38\frac{1}{8}$	$40\frac{3}{8}$	$56\frac{1}{3}$	$26\frac{1}{8}$	40	85	47–54	$27\frac{1}{8}$–$28\frac{5}{16}$	$41\frac{1}{2}$–$47\frac{3}{8}$	79–82	$31\frac{3}{4}$–$37\frac{1}{2}\frac{3}{2}$	$24\frac{1}{2}\frac{1}{2}$–$28\frac{3}{2}\frac{3}{2}$	$59\frac{7}{8}$–$70\frac{1}{2}$	78–92	$62\frac{7}{16}$–63	26–27	$35\frac{1}{2}$–$35\frac{7}{8}$	83–$86\frac{1}{8}$
	III.	90	64	57	50	$44\frac{1}{2}$	35	$39\frac{1}{3}$	$44\frac{4}{5}$	$50\frac{1}{3}$	$43\frac{2}{3}$	$31\frac{1}{3}$	$51\frac{1}{3}$	$71\frac{1}{2}$	$39\frac{1}{2}$	$33\frac{1}{8}$	$56\frac{3}{8}$	$67\frac{3}{8}$	$32\frac{1}{2}$	$28\frac{1}{8}$	69	$79\frac{1}{2}$	$62\frac{7}{16}$	$34\frac{7}{8}$	$35\frac{7}{8}$	$64\frac{1}{5}$
Scots Fir	IV.	60	$81\frac{1}{8}$	$75\frac{7}{16}$	$63\frac{1}{16}\frac{3}{2}$	59	$27\frac{5}{8}$	$29\frac{3}{4}$	$35\frac{1}{16}$	38	..	..	.	..	$58\frac{1}{4}$	$30\frac{7}{16}$	$38\frac{1}{2}$	$73\frac{1}{2}$	37	$33\frac{1}{2}$	$60\frac{1}{2}$	$66\frac{3}{4}$	63	$29\frac{1}{4}$	$35\frac{1}{2}$	$76\frac{1}{2}$
	V.	60	$84\frac{1}{2}$	$78\frac{1}{2}$	66	$61\frac{1}{4}$	$26\frac{1}{3}$	$28\frac{1}{2}$	$34\frac{1}{4}$	$36\frac{3}{8}$	$60\frac{5}{8}$	$30\frac{1}{8}$	$36\frac{3}{4}$	74	$55\frac{5}{8}$	28	$40\frac{1}{4}$	80	..	..	..	..	..	..	..	..
	VI.	60	$83\frac{1}{8}$	$77\frac{3}{8}$	$65\frac{1}{2}$	$61\frac{1}{8}$	27	29	$34\frac{1}{5}$	$36\frac{3}{8}$	$59\frac{1}{3}$	$29\frac{1}{8}$	$37\frac{3}{4}$	$75\frac{1}{4}$	$55\frac{3}{8}$	$30\frac{1}{2}$	$40\frac{1}{4}$	$73\frac{1}{3}$	..	..	..	..	..	..	..	..
	VII.	100	$75\frac{1}{8}$	$69\frac{5}{8}$	$58\frac{5}{8}$	$54\frac{1}{2}$	$29\frac{4}{7}$	$32\frac{1}{8}$	$37\frac{1}{2}$	$41\frac{1}{8}$	$54\frac{1}{8}$	$32\frac{7}{8}$	$41\frac{1}{2}$	$68\frac{3}{5}$	49	$32\frac{1}{2}$	$45\frac{3}{4}$	69	..	..	..	..	..	..	..	..
Larch	VIII.	60	$70\frac{5}{8}$	$62\frac{1}{16}$	$55\frac{3}{3}\frac{3}{2}$	$48\frac{1}{16}$	$31\frac{3}{4}$	$35\frac{3}{4}$	$40\frac{3}{8}$	$45\frac{3}{4}$	..	..	..	..	$43\frac{3}{4}$	$29\frac{4}{6}\frac{5}{4}$	$51\frac{3}{2}\frac{1}{4}$	$75\frac{2}{8}$	35	$31\frac{1}{2}$	64	71	48	$32\frac{1}{2}$	$46\frac{3}{8}$	69
	IX.	60	68	61	53	$47\frac{3}{4}$	33	$36\frac{3}{8}$	$42\frac{1}{2}$	47	$44\frac{3}{4}$	$28\frac{3}{2}$	50	$78\frac{1}{3}$	$39\frac{1}{2}$	$28\frac{1}{2}$	$56\frac{3}{8}$	79	..	..	..	..	..	..	..	..
	X.	60	$77\frac{1}{11}^{0}$	69	61	$54\frac{1}{16}$	$28\frac{3}{4}$	$32\frac{1}{2}$	$36\frac{3}{8}$	$41\frac{2}{5}$	54	39	$41\frac{1}{2}$	$57\frac{2}{5}$	$46\frac{1}{8}$	$34\frac{3}{3}\frac{2}{2}$	$48\frac{4}{7}$	$64\frac{1}{5}$	..	..	..	..	..	..	..	..

RANGE OF AGE AND WEIGHT, AS SHOWN BY TABLES I. TO X.

Species of Tree.	IN THE ROUGH OR UNMANUFACTURED STATE.								IN THE MANUFACTURED STATE.													
	Number of years planted.	Weight per cubic foot.				Number of cubic feet to a ton.				Boards.				Scantlings.				Heartwood.				Sapwood.			
		By Rule 1.		By Rule 2.		By Rule 1.		By Rule 2.		Weight per cubic foot.		Number of cubic feet to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.	
		Bark on.	Bark off.	Bark on.	Bark off.	Bark on.	Bark off.	Bark on.	Bark off.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.	Green.	Dry.
		lb.	lb.	lb.	lb.					lb.	lb.			lb.	lb.			lb.	lb.			lb.	lb.		
Spruce .	35–90	64–$74\frac{1}{3}$	57–$69\frac{7}{8}$	50–$58\frac{4}{8}$	$44\frac{1}{2}$–$55\frac{1}{4}$	$30\frac{1}{8}$–35	32–$39\frac{1}{8}$	$38\frac{1}{8}$–$44\frac{4}{5}$	$40\frac{1}{2}$–$50\frac{1}{3}$	$43\frac{2}{3}$–$56\frac{1}{3}$	$26\frac{1}{3}$–$31\frac{1}{2}$	40–$51\frac{1}{3}$	$71\frac{1}{2}$–85	$39\frac{1}{2}$–54	$27\frac{1}{3}$–$33\frac{1}{8}$	$41\frac{1}{2}$–$56\frac{2}{3}$	$67\frac{3}{8}$–82	$31\frac{3}{4}$–$37\frac{1}{3}\frac{3}{2}$	$24\frac{1}{3}\frac{1}{2}$–$28\frac{3}{2}\frac{3}{2}$	$59\frac{7}{8}$–$70\frac{1}{2}$	78–92	61–63	26–$34\frac{7}{8}$	$35\frac{1}{2}$–$36\frac{3}{8}$	$64\frac{1}{5}$–$86\frac{1}{8}$
Scots Fir	60–100	$75\frac{1}{8}$–$84\frac{1}{2}$	$69\frac{5}{8}$–$78\frac{1}{2}$	$58\frac{5}{8}$–66	$54\frac{1}{2}$–$61\frac{1}{4}$	$26\frac{1}{3}$–$29\frac{4}{7}$	$28\frac{1}{2}$–$32\frac{1}{8}$	$34\frac{1}{4}$–$37\frac{1}{2}$	$36\frac{3}{8}$–$41\frac{1}{8}$	$54\frac{1}{8}$–$60\frac{5}{8}$	$29\frac{1}{8}$–$32\frac{7}{8}$	$36\frac{3}{4}$–$41\frac{1}{2}$	$68\frac{3}{5}$–$75\frac{1}{4}$	49–$58\frac{1}{4}$	28–$32\frac{1}{2}$	$38\frac{1}{2}$–$45\frac{3}{4}$	69–80	37	$33\frac{1}{2}$	$60\frac{1}{2}$	$66\frac{3}{4}$	63	$29\frac{1}{4}$	$35\frac{1}{2}$	$76\frac{1}{2}$
Larch. ..	60	68–$77\frac{1}{11}^{0}$	61–69	53–61	$47\frac{3}{4}$–$54\frac{1}{16}$	$28\frac{3}{4}$–33	$32\frac{1}{2}$–$36\frac{3}{8}$	$36\frac{3}{8}$–$42\frac{1}{4}$	$41\frac{2}{5}$–47	$44\frac{3}{4}$–54	$28\frac{3}{5}$–39	$41\frac{1}{2}$–50	$57\frac{2}{5}$–$78\frac{1}{3}$	$39\frac{1}{2}$–$46\frac{1}{8}$	$28\frac{1}{4}$–$34\frac{3}{3}\frac{2}{2}$	$48\frac{4}{7}$–$56\frac{2}{3}$	$64\frac{1}{5}$–79	35	$31\frac{1}{2}$	64	71	48	$32\frac{1}{2}$	$46\frac{3}{8}$	69

CHAPTER III.

MISCELLANEOUS EXPERIMENTS RELATIVE TO WEIGHT.

1. On 20th March, 11 logs of Scots fir were taken at random, as carted in to a saw-mill. They were from a plantation 40 years planted, and their mean average growth, measuring from the centre to the circumference, was about an inch in 7 years. Their lengths ranged from $6\frac{1}{4}$ to 16 feet, and their quarter-girts from $4\frac{1}{2}$ to $9\frac{3}{4}$ inches after removal of bark. The content of the whole was $35\frac{17}{144}$ solid feet by Rule I. The weight, including bark, was 87 lb. per cubic foot, being $25\frac{6}{87}$ feet to a ton. Young fir very heavy.

2. On 15th January, there was cut from a Scots fir, 53 years planted, a piece 3 feet long, 3 to 6 feet from tree-root. After removal of bark, the girth was 45 inches at the middle, and the weight 196 lb., being $74\frac{1}{2}$ lb. per cubic foot by Rule I., and $30\frac{1}{15}$ feet per ton. Calculating by Rule II., the solid content would be $3\frac{3}{8}$ feet; the weight about 58 lb. per foot, being $3\frac{18}{29}$ feet to a ton. Four slabs were sawn off by a circular saw (No. 11), taking out about $\frac{5}{32}$ inch at each draught. The log, thus reduced to 3 feet, $11\frac{1}{4}$ by $11\frac{1}{4}$ inches, weighed 147 lb., being 56 lb. per cubic foot, and 40 cubic feet to a ton. Pieces were then sawn from the slabs, and the vacancies at the four angles filled exactly with them. The log, thus rendered die-square, weighed 154 lb., being $58\frac{1}{2}$ lb. per net cubic foot; thus proving that Rule II., when applied to a short piece of timber, is pretty nearly accurate. The four backs, or slabs, weighed 43 lb. The sawing in the operation of slabbing measured $7\frac{1}{8}$ superficial feet, and the loss of wood by the saw was about $\frac{1}{10}$ of a solid foot by measure, and 6 lb., or $\frac{1}{49}$, by weight. Adding the 43 lb. slabs to the 6 lb. sawdust, the loss in the weight by squaring was $18\frac{1}{2}$ lb. per cubic foot, being $33\frac{1}{4}$ per cent of a reduction on the weight of the barked round timber. Application of Rule II. About one-third of the weight sawn off in squaring.

3. On 31st August, a piece of Scots fir sapwood, the produce of a

tree 60 years planted, 12 inches, 3 by $1\frac{1}{2}$ in., solid content $4\frac{1}{2}$ parts, weighed 34 oz., being 68 lb. per cubic foot, and $32\frac{16}{17}$ feet to a ton. After hanging two months by the kitchen fire, it weighed 14 oz., being 28 lb. per cubic foot, and 80 cubic feet to a ton. Measuring from centre to circumference, it had grown an inch in 9 years.

Weight of sapwood.

4. On 31st August a log of Scots fir, 60 years planted, was cut and stripped of bark. Its length was $21\frac{1}{2}$ feet; circumference at middle 38 inches; and solid content (by Rule I.) $13\frac{17}{36}$ feet. It weighed 1036 lb., being $76\frac{3}{4}$ lb. per foot round timber. It was then sawn into two beams, each 9 by $4\frac{1}{2}$ inches, the solid content of which is $10\frac{3}{4}$ feet; the weight 623 lb., being $57\frac{41}{43}$ lb. per cubic foot in the green state. At the same time, another log, from same plantation, same age, $21\frac{1}{2}$ feet long, was squared to 9 by 9 inches, the solid content of which is 12 feet. It then weighed 540 lb., being 45 lb. per cubic foot green. Each of these two trees had grown about an inch in seven years, but the latter was nearly all very spongy heartwood, and apparently not at all in a healthy state.

Unsound timber may be very light.

5. In spring a Scots fir, 100 years planted, was cut from the root. Its diameter was 24 inches near the base, and 23 inches 12 feet up, where it parted into boughs. It will be observed that its growth had been remarkably rapid. Towards the commencement it had been an inch in $3\frac{1}{2}$ years, the time gradually extending till towards the period of felling, when it diminished to an inch in 10 years. Under ordinary circumstances its timber would have been light and porous, but the reverse was the case; it was the heaviest Scots fir that has ever come under the author's notice. On being cut into planks, it was, in several places, difficult to distinguish the heartwood from the sapwood. These peculiarities arose from *disease* in the tree. At the point where the boughs struck out, the sap stagnated, the wood was soft, dry, brittle, and worthless, and the trunk below was glutted and stuffed with resin.

Diseased timber may be very heavy.

A plank 12 feet, 22 by $1\frac{1}{4}$ inches, from near the centre, was treated as follows:—After being sawn, and dried for six months in the open air, a lineal foot was cut from the base, and a piece from the side, 4 inches broad, apparently all sapwood, weighed at the rate of 34 lb. $6\frac{3}{4}$ oz. per cubic foot, being 65 feet to a ton. It had grown at the rate of an inch in 7 years. Another piece of like dimensions from the opposite outside of the plank, but of which it was difficult to say whether it was sapwood or heartwood from mere appearance, weighed 38 lb. $0\frac{3}{8}$ oz. per cubic foot, being 58 feet to a ton. It had grown an inch in 7 to 10 years. A third piece, 1 foot square, was taken from the

middle, composed entirely of heartwood, and weighed 47¾ lb. per cubic foot, being 47 feet to a ton. This section had grown an inch in 3½ to 5 years. The remainder of the plank was weighed entire, and its weight was 40¾ lb. per cubic foot, being 55 cubic feet to a ton. As nearly as could be judged, the entire heartwood was 15 inches broad, and the growth of 42 years. A piece of good, dry, yellow-pine plank, which had grown an inch in 10 years, was weighed same day, and found to be 24¾ lb. per cubic foot, being 90½ feet to a ton. And "50 cubic feet of squared timber is a load!" What is a "load" of timber?

6. On 10th May a Scots fir was cut in Abernethy Forest, Strathspey. At the point experimented on, 4 feet from root, it was 9 inches diameter, and the growth of 223 years. A board from it, 1 inch thick, was dried in the open air for two months, when the heartwood weighed 37⅛ lb. per cubic foot, being 60⅓ feet to a ton; the sapwood weighed 34$\frac{5}{16}$ lb. per cubic foot, being upwards of 65 feet to a ton. The rate of growth was—heartwood an inch in 45 years, and sapwood an inch in 58 years. At the point of junction of the sapwood with the heartwood, it had grown for 27 years at the rate of an inch in 104 years; it had then started and grown vigorously for 60 years, and was quite healthy when cut down, its 4 last years being its best during 200 years. Weight of aged fir. Different rates of growth.

7. In August a Scots fir was cut in Abernethy Forest, and a log cut from near the base was the growth of 240 years. The results of experiments with it were as follows:—After the bark was stripped off, the round wood weighed 76 lb. per cubic foot, being about 29½ feet to a ton. Manufactured, the weight stood thus:—

	Weighed 29th August.		Weighed 28th October.		Weighed 2d February.	
	Lb. per cubic foot.	Cubic feet to a ton.	Lb. per cubic foot.	Cubic feet to a ton.	Lb. per cubic foot.	Cubic feet to a ton.
A fair proportion of heartwood and sapwood	59¾	37½	42¼	53	40¾	55
Heartwood alone,	51	43$\frac{47}{51}$	47½	47⅛	44¾	50
Do. do., but containing a considerable quantity of resin	53	42¼	48½	46⅕	46	48⅔
Sapwood alone	67	33$\frac{29}{67}$	36¾	61	36⅜	61⅗

The wood of the tree had grown very irregularly; and it was only by measuring it in small sections that the solid content could be

Age of heartwood.

ascertained. The average diameter of the heartwood was 10½ inches, its age 130 to 140 years, and its average growth an inch in about 26 years. The average growth of the sapwood was 3 inches in 100 to 110 years; but during one period it had taken all that time to grow three-fourths of an inch. The central portion of the heartwood, containing the pith, had grown rather faster, and was lighter than that towards the sapwood; the outer portion of it contained a considerable quantity of resinous matter, and was the heaviest part of the tree when dry. The bark was from 1 to 1½ inches thick.

Nearest pith lightest.

8. In January a larch 35 years planted was cut. The lower 6 feet, being a little dry, was thrown aside, the next 6 feet, 25 to 30 years growth, girthed at middle 21 inches over bark, and 18¾ under it, being 1 in 9⅓. The entire section weighed 76¼ lb. with the bark, and 66½ lb. without it, being 82½ lb. and 72 lb. respectively, per cubic foot. The sapwood was the growth of 14 years, and formed a ring 1¼ inches thick, and had grown an inch in 11½ years. The average growth, measured from centre to circumference, was an inch in about 10 years.

Weight of young larch.

9. On 5th February a piece 12 inches long was cut, at 6 feet above the root, from a round larch 70 years planted, and the results of experiments with it were as follow, in the round and manufactured states:—

IN THE ROUND STATE.							IN THE MANUFACTURED STATE.				
	Girths in inches.	Solid content by Rule 1.			Weight per cubic foot.	Number of cubic feet to a ton.		Weight per cubic foot.		Number of cubic feet to a ton.	
								Green.	Dry.	Green.	Dry.
		ft	in.	pts.	lb.			lb.	lb.		
Bark on, .	65½	..	..	..	66½	33⅝	Section of Heartwood, 1 foot, 4 by 1½ in. .	40⅝	33	35¾	67⅞
Bark off, .	59½	1	6	2¾	60¼	37⅛	Section of Sapwood, 1 foot, 4 by 1½ in. .	66¾	30	38	74⅝

Weight of aged larch.

While one-half of the log was cut into sections as above, the other, weighing 47 lb. green, was laid aside in the rough state for three months to dry, and then weighed 34 lb., being a reduction of 27⅔ per cent, bark excluded in both cases. The reduction would probably have been a little more still, had it got longer time to dry. Measuring from centre to circumference, the wood grew an inch in about 7⅓ years on an average. The bark weighed 6¼ lb. per cubic foot round timber, or $\frac{1}{11}$ of the gross weight.

Note.—The whole of the foregoing experiments were made when the bark was entirely free from rain water. Scots fir bark lying in water will absorb 60 to 80 per cent of its natural weight; larch, 40 to 60 per cent; and spruce, 15 to 20 per cent, thereby increasing the weight of the round timber in proportion.

Power of absorbing water.

TABLE XII.

MISCELLANEOUS EXPERIMENTS—HARDWOOD. Weight of Oak, Ash, Elm, Beech, Birch, Plane, and Horse-Chestnut; Felled, Measured, and Weighed, and Sawn and Weighed, August 31; and again Weighed when Dry, October 28.

IN THE ROUGH OR UNMANUFACTURED STATE.												IN THE MANUFACTURED STATE.									REMARKS.
Species of tree.	No. of years planted.		Girth in inches.	Solid content. By Rule 1.		Solid content. By Rule 2.		Gross weight.	Weight per cubic foot. By Rule 1.	Weight per cubic foot. By Rule 2.	Number of cubic feet to a ton. By Rule 1.	Number of cubic feet to a ton. By Rule 2.		Dimensions of section.		Solid content.		Gross weight. Green.	Gross weight. Dry.	Weight per cubic foot Green.	Weight per cubic foot Dry.	Number of cubic feet to a ton. Green.	Number of cubic feet to a ton. Dry.	
				in.	pts.	in.	pts.	lb.	lb.	lb.				foot.	inches.	pts.	fths.	lb.	lb.	lb.	lb.			
Oak,	100	Bark on,	32½	..	..	..	..	35	90	70	24⅝	32	Heart of log,	1	3 × 2	6	0	2⅞	2 37/32	69	53¼	32½	42	The bark of the first specimen of oak weighed 3½ lb. green, being 9 lb. per cubic foot. After being dried two months, it weighed 2 lb., being 5½ lb. per cubic foot round timber. The sapwood formed a ring ⅞ inch thick, and was the growth of 12 years.
		Bark off,	30	4	8	6	0	31½	81	63	27⅝	35½	Sapwood,	1	3 × ¾	2	3	0.15 9/16	0 4/4	62½	41	36	54⅝	
Oak,	52	Bark on	27	..	..	..	..	24 23/32	93 3/32	72 13/16	24	30¾	Heart of log,	1	3 × 2	6	0	3 5/4	2 7/8	73⅞	50¾	30⅝	44⅕	
		Bark off,	24¾	3	2¼	4	1	22⅛	83¼	65	26½	34½	Outside,	1	3 × 2	6	0	2 3/4	2	67⅛	48	33⅜	46⅔	
Ash,	52	Bark on,	38½	..	..	..	..	41 1/16	73	57	30⅝	39⅓	Heart of log,	1	3 × 2	6	0	2 3/32	1⅝	51¾	42	43¼	53½	The bark of the elm was quite smooth and full of sap. The sapwood formed a ring 1½ inches thick, and was the growth of 30 years. There was little distinction visible between the centre and outside of the beech. The sap-vessels of the birch were very small, and near the outside almost vacant, while towards the centre they were stuffed with a whitish gum.
		Bark off,	36	6	9	8	7⅜	36⅞	65½	51⅓	34⅕	43⅔	Outside,	1	3 × 2	6	0	2 7/32	1 13/16	53¼	42⅜	42	52⅞	
Elm,	70	Bark on,	27½	..	..	..	..	21⅓	76	59⅝	29½	37½	Heart of log,	1	3 × 2	6	0	2 5/4	1 9/16	53⅝	37½	41⅔	59⅜	
		Bark off,	25½	3	4	4	3	18¼	65½	51½	34⅕	43⅓	Outside,	1	3 × 2	6	0	2 3/32	1 33/64	54⅞	38⅝	41	58	
Beech,	70	Bark on,	36	..	..	..	..	44 7/16	84 3/16	65¼	26⅜	34⅓	Heart of log,	1	3 × 2	6	0	2 4/4	1 1/8	63⅜	46½	35⅓	48⅛	
		Bark off,	35	6	4	8	2	42 5/16	80⅛	62⅓	28	36	Outside,	1	3 × 2	6	0	2 1/4	1 3/32	64⅕	45⅞	34⅞	49	
Birch,	70	Bark on,	38½	..	..	..	..	43⅕	82¾	64⅝	27	34⅜	Heart of log,	1	3 × 2	6	0	2 7/16	1 1/16	58⅛	40½	38⅛	55⅕	
		Bark off,	34⅞	6	3	8	0	37 5/16	71⅛	55	31¼	40 8/11	Outside,	1	3 × 2	6	0	2 25/64	1¾	57⅜	42	39	53⅛	
Plane,	52	Bark on,	39¾	..	..	..	..	52 5/16	87 9/16	67 13/16	25⅘	33	Heart of log,	1	3 × 2	6	0	2 1/32	1 3/32	62¼	43½	36	51½	
		Bark off,	37½	7	2	9	3	47	78 1/16	61	28⅞	36⅜	Outside,	1	3 × 2	6	0	2 3/32	1 5/8	63¾	46⅕	35⅞	48⅘	
Horse-chestnut	52	Bark on,	38½	..	..	..	..	40 9/16	69 7/32	54 9/16	32⅕	41	Heart of log,	1	3 × 2	6	0	2 1/4	1 1/32	52⅝	32¼	43	69½	
		Bark off,	36½	7	0	8	11	35 3/16	61⅜	48 3/16	36⅓	46½	Outside,	1	3 × 2	6	0	2 7/32	1⅜	53⅓	33	42	67⅜	

REMARKS ON TABLE XII.

These experiments were made with hardwood for the purpose of affording ground of comparison with the Scots fir, &c. While the writer was conducting those with the oak, the relative weight of the heartwood and sapwood came out so far contrary to all that he had experienced with the fir that he was led to imagine there must be an error in the calculations. These were gone over repeatedly, with the same results. Observing that they gave the specific gravity of the oak sapwood as less than that of water, he put a chip consisting of sapwood and heartwood into water. It plunged below the surface, but, slowly turning over, it rose *to* the surface, but not perceptibly above it. The kinds were then separated by means of a knife, when the heartwood directly sank to the bottom, and the sapwood showed a little above the surface. The outside section of younger oak contained a proportion of heartwood along with the sapwood. The quality of the elm was inferior; all the others were of fair quality, each of its kind.

Green sapwood of oak lighter than heartwood.

What is to be understood by the term "dry state" of wood, as used in the present work, is that attainable by free exposure to the open air. So much had the timber dried in the time given, that when some of the specimens were again weighed about a year subsequently, no difference of practical importance was observable. Still it must be kept in mind that all have not like facilities for drying sawn timber. The author made a number of other experiments besides those now more prominently brought forward; but as they were attended by the like results, it appears unnecessary to encumber this work with them.

The following statement, from the works of Wallace and Templeton, closes this chapter:—

	Weight per cubic foot.			Weight per cubic foot.	
	Wallace.	Templeton.		Wallace.	Templeton.
	lb.	lb.		lb.	lb.
Ash,	47·5	52	Larch,	33·8	31
Beech,	43·8	53¼	Lignum Vitæ,	83·3	83½
Birch, common,	43·8	49½	Mahogany,	39·8	...
Do., American,	46·9	40½	Maple,	46·9	47
Deal, Christiana,	42·5	42	Norway spruce,	...	28½
Do., Memel,	36·9	...	Oak, Canadian,	54·5	42
Elm,	33·8	42	Do., English,	56·3	58
Fir, New England,	34·4	...	Do., African,	61·3	59
Do, Riga,	46·9	...	Do., Adriatic,	61·9	...
Do., Mar Forest,	43·8	...	Pine, pitch and red,	41·3	46 & 42

CHAPTER IV.

PRACTICAL LESSONS TO BE LEARNED FROM THE FOREGOING EXPERIMENTS.

I. THE ALLOWANCE TO BE MADE FOR BARK IN TAKING THE GIRTH.

Norway Spruce—

Young, or quickly grown, towards the root, 1 in 20 to 30 inches; towards the top, 1 in 35 to 40 inches.

Old, or slowly grown, towards the root, 1 in 12 to 20 inches; towards the top, 1 in 20 to 30 inches.

Scots Fir—

Young, or quickly grown, towards the root, 1 in 10 to 14 inches; towards the top, 1 in 22 to 28 inches.

Old, or slowly grown, towards the root, 1 in 10 to 14 inches; towards the top, 1 in 16 to 20 inches.

Larch—

Usually 1 in 10 to 12 inches towards the root, and 1 in 12 to 16 inches towards the top.

Note.—In exposed situations, trees have thicker bark than towards the centre of a large plantation. Unlike the spruce and Scots fir, the thickness of the bark is pretty uniform, in proportion, along the entire length of a larch tree.

Trees in exposed situations have thicker bark.

II. THE WEIGHT OF THE BARK PER CUBIC FOOT ROUND TIMBER, BY RULE I.

Norway Spruce—

Young, or quickly grown, 4 to 5 lb. per cubic foot = 1 to $1\frac{1}{2}$ cwt. per ton of round timber.

Old, or quickly grown, 5 to 7 lb. per cubic foot = $1\frac{1}{2}$ to $2\frac{1}{4}$ cwt. per ton of round timber,

Scots Fir—

In extreme cases, 4 to 7 lb., but commonly 5 to 7 lb., per cubic foot = $1\frac{1}{4}$ to $1\frac{3}{4}$ cwt. per ton of round timber.

Larch—

In extreme cases, 6 to 10 lb., but commonly 7 to 9 lb., per cubic foot = 2 to $2\frac{3}{4}$ cwt. per ton of round timber.

Increased weight of bark exposed to moisture.

Note.—Exposure to wet, more especially if the timber is felled, will increase the weight of the bark;—that of spruce, being of compact texture, 15 to 20 per cent; that of the larch, being thicker, but still of compact texture, 40 to 60 per cent; that of the Scots fir, being of loose texture, and the old scales adhering long in a semi-detached state, 60 to 80 per cent of the natural weight.

III. THE WEIGHT OF ROUND TIMBER IN THE GREEN STATE, INCLUDING BARK.

	Weight per cubic foot.	Cubic feet to a ton.
	lb.	feet.
Norway Spruce—		
Young, or rapidly grown,	70 to 76	$29\frac{1}{2}$ to 32
Aged, or slowly grown,	64 to 70	32 to 35
Scots Fir—		
Young, or rapidly grown,	80 to 85	26 to 28
Aged, or slowly grown,	75 to 80	28 to 30
Larch—		
Young, or rapidly grown,	70 to 75	30 to 32
Aged, or slowly grown,	66 to 70	32 to 34

Note.—Knotty crooked trees, of irregular growth, will weigh 1 to 5 per cent more than the above; and if the bark is wet, still more.

IV. If a tree is measured in short sections, approaches nearly to a cylindrical form, and allowance is made for the greater weight of sapwood as compared with heartwood, in the green state the weight of round timber, as given by Rule II., is about the same as squared or hewn timber. Compare a cubic foot round wood as given by Rule II. with weight per foot in boards in Tables II., III., &c.

V. THE WEIGHT OF TIMBER WHEN SAWN INTO STRAIGHT-EDGED BOARDS.

	Weight per cubic foot, net.		Cubic feet to a ton.	
	Green.	Dry.	Green.	Dry.
	lb.	lb.	feet.	feet.
NORWAY SPRUCE—				
Young, or rapidly grown,	50 to 57	25 to 28	$39\frac{1}{4}$ to $44\frac{4}{5}$	80 to $89\frac{2}{3}$
Aged, or slowly grown,	43 to 50	28 to 32	$44\frac{4}{5}$ to 52	70 to 80
SCOTS FIR—				
Young, or rapidly grown,	58 to 62	28 to 31	36 to $38\frac{1}{2}$	$72\frac{1}{4}$ to 80
Aged, or slowly grown,	54 to 60	33 to 43	$37\frac{1}{3}$ to $41\frac{1}{2}$	52 to 68
LARCH—				
Young, or rapidly grown,	42 to 46	28 to 32	$48\frac{2}{3}$ to $53\frac{1}{3}$	70 to 80
Aged, or slowly grown,	50 to 55	32 to 40	$39\frac{1}{4}$ to 41	56 to 70

Note.—It requires to be kept in mind that much of the sapwood—the heaviest part of the tree while green, and the lightest when dry—is cut off the sides and edges of the boards in the act of manufacture. This makes the boards lighter per foot when newly sawn, and heavier when dry, than they would be were it possible to retain the whole timber. None but the very oldest Scots fir reaches the greatest weight in the dry state given above. 33 lb. per foot, or 68 feet to a ton, dry timber, is very good quality. As already shown by the miscellaneous experiments, diseased trees may weigh more even than 43 lb. per foot; but there is another form of disease which makes them weigh less than the least given above. When trees are cut into parallel-sided boards, or scantlings, still more of the sapwood is cut off—as a matter of course making the weight of the green and dry cubic foot approach more nearly.

In squaring timber, the largest part of what is cut off is sapwood.

VI. Timber newly felled, and submerged in water, absorbs 5 per cent of its own weight in course of three days.

Note.—A log of Scots fir, partially dried, was thrown into a mill-pond, and floated there for upwards of a year.

VII. THE WEIGHT OF HEARTWOOD.

	Weight per cubic foot.		Cubic feet to a ton.	
	Green.	Dry.	Green.	Dry.
	lb.	lb.	feet.	feet.
NORWAY SPRUCE—				
Young, or rapidly grown,	31 to 37	24 to 29	60½ to 72¼	77 to 93
Aged, or slowly grown,	31 to 33	27 to 30	68 to 72¼	74½ to 83
SCOTS FIR—				
Young, or rapidly grown,	36 to 38	33 to 35	59 to 62¼	64 to 68
Aged, or slowly grown,	48 to 53	35 to 46	42 to 46½	48½ to 64
LARCH—				
Rapidly grown,	34 to 36	31 to 33	62¼ to 66	68 to 72¼
Aged, or slowly grown,	36 to 40	33 to 35	56 to 62¼	64 to 68

VIII. THE WEIGHT OF SAPWOOD.

	Weight per cubic foot.		Cubic feet to a ton.	
	Green.	Dry.	Green.	Dry.
	lb.	lb.	feet.	feet.
NORWAY SPRUCE—				
Young, or rapidly grown,	60 to 64	26 to 28	35 to 37⅓	80 to 86
Aged, or slowly grown,		28 to 34		66 to 80
SCOTS FIR—				
Young, or rapidly grown,	63 to 68	28 to 32	33 to 35½	70 to 80
Aged, or slowly grown,		33 to 37		56 to 60½
LARCH—				
Young, or rapidly grown,	60 to 66	30 to 32	34 to 37⅓	70 to 74½
Aged, or slowly grown,		30 to 34		66 to 74½

Heartwood does not increase in all trees alike.

Note.—Heartwood does not increase in like ratio in any two trees; and as its weight in all states differs so widely from that of sapwood, it is evident that the weight of a tree must in large measure be ruled by what it contains of each. In like manner, a beam or board from the centre of a tree will weigh very differently from a beam or board cut from near the outside of the same tree at the same minute. A whole tree will also weigh differently per cubic foot at different periods of its existence; and we have seen that two trees of same species and age, and grown side by side, differ greatly in weight, although they were alike healthy. This is accounted for by the different rates of increase in size. It is an old proverb that "All the trees in the forest

Trees grown side by side differ much in weight.

do not grow alike." Sapwood of the three or four years most recently passed, is frequently found of the same specific gravity in a tree of 50 years as in that of 250 years of age.

General accuracy of these statements.

The author has had very frequent, almost daily, occasion to test the accuracy of the statements now given—having to forward large quantities of timber by cart and railway, and to estimate the weight of given quantities of it, manufactured, before an axe is laid to the round tree in the plantations. He cannot recollect any case in which the real differed so much as 5 per cent from the estimated weight; but then he was dealing with plantations the timber of which he was well acquainted with. The state of the weather always affects the weight of manufactured timber less or more.

State of roads affects value.

In commencing to cut timber in a plantation, the first subject that comes up for consideration is, whether it will be most advantageous to expend a given sum of money on road-making, or to bring it out in such quantities and in such manner as may be done by existing roads and paths. In many cases the purpose for which roads are required in a plantation is comparatively temporary; it is, therefore, scarcely to be expected that they will be made good and substantial to every part of it. Still there is nothing which affects the value of round timber more than the state of the roads in and from the plantation in which it has grown. Where they are bad, 15 cwt. at a load, day by day, and week by week, for a lengthened period, may be found a harder task for a horse than 20 to 25 cwt. on a good commutation road, or 25 to 30 cwt. on a level turnpike; and a short piece of bad road may lead to the loss of nearly all the advantages that would arise from all the rest of the way being good. In addition to this, the expense of loading and unloading a cubic foot increases in proportion as the quantity that can be loaded at a time decreases.

EXPENSE OF TRANSPORT BY HORSE AND CART OR WAGGON.

Expenses of horse and cart, &c.

This must vary from time to time according to the rate of wages, price of horses, and, above all, to the price of grain and hay. Taking 3000 hours, or 300 days of 10 hours each, as the time which a horse can work in a year, his expenses and that of his driver must be met in that time. In rural districts in the north of Scotland, the average expenses for the last seven years have been much as follows:—

		Per an.	Per day.	Per hour.
Driver—				
Money-wages per annum, . .	£22			
Victuals, fuel, and house accommodation per annum, ...	13			
	—	£35	2s. 4d.	2·8d.
Horse and Cart and Harness—				
Interest of capital invested, deterioration, risk, stable-room, shoeing, &c., .	£10			
Hay, at 8d. per st., grain at 24s. per qr.,	40			
	—	50	3s. 4d.	4d.
For a strong horse and cart, .		£85	5s. 8d.	6·8d.

On good roads, with a considerable distance to cart, one man may manage two horses, when the expense per cart will be reduced to £67, 10s. per annum; 4s. 8d. per day; 5·4d. per hour. The most effective pace for a sound horse with a loaded cart is 2½ miles per hour, along a fair road. Horses unaccustomed to steady work are disposed to do more, but soon either get tamed down to this rate, or destroy themselves. The time required to load and unload a ton of round timber depends much on its accessibility, and the size of the various pieces of which it may happen to be composed. Under ordinary circumstances, 3 or 4 men will load a cart with a ton of round timber in 4 minutes, and unload it in 2 minutes, being 10 tons per hour—say 2d. per ton for men and horse.

Most effective pace for a horse with a load.

Expense of hiring.

The rates at present paid for a hired horse and cart differ very much, but the average is, in rural districts—for a light horse and cart, 7d. per hour, 5s. 10d. per day, £87, 10s. per year of 300 days; for a horse and cart of fair average capability, 8d. per hour, 6s. 8d. per day, £100 per year of 300 days. In towns a common rate is 1s. per hour, 10s. per day of 10 hours, or £150 per year of 300 days.

Expense per railway.

The expense of carriage of timber by railway differs on different lines, and even in like distances on the same line; but in nothing is the advantage of these more plainly shown than in the transit of timber. Before the introduction of a line into the parish in which this is written, the expense per cart to the nearest seaport was 20s. per ton; now it is 4s. 6d. per railway. The expense of loading a waggon from the loading-bank is 2d. to 3d. per ton for smaller quantities, larger quantities less.

CHAPTER V.

THE EXPENSE OF MANUFACTURE.

This branch of the subject includes a large variety of topics. These are :—

The various means of Sawing, with the Comparative Expense of each ;
Saw-Measure and Sale-Measure ;
Loss of Timber by Saws of various Thicknesses ;
Expense of Sawing Trees of different Sizes, and consequent
Expense of, and Loss in, Sawing Wood for different Purposes.

THE VARIOUS MEANS OF SAWING, WITH THE COMPARATIVE EXPENSE OF EACH.

There are two means of sawing,—the arm-saw, worked by two men —and the saw-mill, propelled by water, steam, &c. Each of these has its relative advantages and disadvantages.

Of the arm-saw.

The arm-saw is easily brought to bear on a small plantation, or on a given section of a larger one ; thus occasioning little expense in bringing the round timber to the place of manufacture. The outfit for saw and covered pit is a matter of a very few pounds. The saw cuts out only about $\frac{3}{32}$ inch at each draught; the loss of timber in the process of manufacture is thus apparently little. The great drawback to the use of it is the high rate necessarily charged, as compared with what the cost is by machinery, in sawing larger quantities of timber. There is another, though less important disadvantage—viz., the uneven surface of a board as compared with that done by machinery. This unevenness occasions more labour to the carpenter in producing a smooth surface; and what with the action of the saw, and the action of the plane in dressing sufficiently, nearly as much wood is consumed as is done by the circular saw, and considerably more than by the vertical frame saw of machinery. The present rates

Advantages and disadvantages.

by the arm-saw are 2s. to 2s. 3d. per 100 superficial feet, saw-measure, for Scots fir, and 2s. 6d. to 2s. 9d. for larch. That of Norway spruce is about half-way between the two.

Water as a motive power.

The original cost of machinery differs very widely. Where a sufficient supply of water as the motive power can be had at moderate expense, and in a convenient place, it is the least expensive of any. The expense of machinery suitable for a water-mill is comparatively little, and, if everything connected with it is substantially executed at the outset, the expense of maintenance is almost nominal. A breast start-and-ave wheel, owing to the great steadiness of its motion, is the most desirable; but it requires a large supply of water—in fact, such a supply as few places can command. Where the quantity of water is too limited for it, the bucket overshot wheel must be used; but the motion of the mill driven by means of it is very unsteady, and requires continual attention on the part of the workmen. Governors, on something of the same principle as those applied to the steam-engine, have been tried, but never have come into general use. Their action is not sufficiently prompt. The greatest help towards steadiness of motion is a very heavy fly-wheel.

Unsteady motion of overshot wheels.

Mill with breast-wheel.

Under the author's charge there is a saw-mill driven by water. The outer wheel is of the start-and-ave kind, remarkably strong; although composed of two metal rings 10 feet diameter, it weighs 29 cwt. The aves are $5\frac{1}{2}$ feet broad, by 15 inches deep. The amount of fall is $3\frac{1}{2}$ feet. This drives two circular saws, and the estimated cost is as follows:—

Excavations, stone water-wall, and wooden shed, . . .	£70
Machinery, saws, and benches, ...	70
Weir (a very substantial erection, exclusively stone, 170 yards long, in a large river), ...	160
Total expense, ...	£300

Mill with overshot bucket-wheel.

Another mill under his charge is driven by an overshot bucket-wheel 16 feet diameter, the buckets being 4 feet broad. This drives three saws, and boring machinery of various kinds. The estimated cost of this mill is—

Excavations, stone water-wall, and wooden shed, . . .	£70
Machinery, two saws, and benches, ...	100
Pond, &c., ...	30
Total expense for mill with two saws, . . .	£200

The third saw stands outside, is used exclusively for cutting up long fencing. It, with the requisite shafting, &c., and boring machinery, is worth about £60 more. Owing to the very unsteady motion of this sort of wheel, the whole machinery cannot be conveniently worked at one time.

A third mill under his charge is driven by an English-made portable steam-engine, given as 8-horse power. The diameter of the cylinder is 9 inches, and the length of stroke 12 inches. It drives two saws, and the cost is as follows :— Portable steam-engine.

Excavations and substantial wooden shed, ...	£40
Saws and saw-benches (no machinery required), . . .	30
Portable steam-engine, with fittings (delivered free in Aberdeen),	239
Amount, ...	£309

The annual expense of each of these three mills, working 10 hours a-day for 300 days, may be estimated thus :—

I.	To interest on capital, at 4 per cent, ...	£12	0	0
	To tear and wear, and fire insurance, ...	20	0	0
	To oil, files, saws, and repairs to do., ...	10	0	0
	To land-rent, at agricultural value, and taxes, . .	3	0	0
	Rate, 3·6d. per hour, 3s. per day of ten hours, and per annum	£45	0	0
II.	To interest on capital, at 4 per cent, ...	£8	0	0
	To tear and wear, and fire insurance, ...	20	0	0
	To oil, files, saws, and repairs to do., ...	10	0	0
	To land-rent, at agricultural value, and taxes, . .	3	0	0
	Rate, 3·3d. per hour, 2s. 9d. per day of 10 hours, and per annum	£41	0	0
III.	To interest on capital, at 4 per cent, ...	£12	7	2
	To tear and wear, and fire insurance, ...	40	0	0
	To oil, files, saws, and repairs to do., ...	13	0	0
	To land-rent, and taxes, ...	3	0	0
	To wages of fireman—52 weeks, at 15s., . . .	39	0	0
	To fuel, ...	27	12	10
	Rate, 10·8d. per hour, 9s. per day of ten hours, and per annum	£135	0	0

Expense by water-power.

Expense by steam-power.

On the nature of work to be performed depends very much the

Hands required.

number, and sort of hands, required to work efficiently, any one of these mills with its two saws. If the work is light—such as cutting up barrel-staves—two men and three boys may be sufficient; but where it is heavy—such as roofing, boards, &c., from trees of larger size—two men will be required to each saw, and one or two labourers, just as the trees are free of sand, &c., or not. The rate of wages also differs necessarily under different circumstances. In towns where rents are high, and various other things proportionally so, 20s. per week may not be found equal to 16s. per week in a country place, with steady work, and the more moderate rate of expenditure.

Wages of men.

Granting 16s. per week to be fair wages for a saw-miller getting steady employment in one place, and 14s. per week for a labourer; and that four saw-millers and a labourer are sufficient for a mill with two saws, then the rate for wages will be—

	Per hour.		Per day of 10 hours.		Per year of 300 days.
4 saw-millers, . . .	1s. 0·8d.	...	10s. 8d.	...	£160
1 labourer, ...	0s. 2·8d.	...	2s. 4d.	...	35
Total, 5 men,	1s. 3·6d.		13s. 0d.		£195

The expense of the water-mill and men will then be—

Water-mill and men.

	Per hour.		Per day.		Per annum.
Men, ...	1s. 3·6d.	...	13s. 0d.	...	£195
Mill, ...	0s. 3·6d.	...	3s. 0d.	...	45
	1s. 7·2d.		16s. 0d.		£240

The expense of the steam-mill and men will be—

Steam-mill and men.

	Per hour.		Per day.		Per annum.
Men, ...	1s. 3·6d.	...	13s. 0d.	...	£195
Mill, ...	0s. 10·8d.	...	9s. 0d.	...	135
	2s. 2·4d.		22s. 0d.		£330

If the wages of a saw-miller be 20s. per week, and those of a labourer 16s., then the expense will be, by the

	Per hour.		Per day.		Per annum.
Water-mill and men, . .	1s. 10·4d.	...	18s. 8d.	...	£280
Steam-mill and men, . .	2s. 5·6d.	...	24s. 8d.	...	370

It is quite possible to cut timber with a circular saw, at the rate of 36 superficial feet per minute *while in the very act of sawing.* This

would be 2160 feet per hour, and 21,600 feet per day of 10 hours, were it possible to continue such a length of time; but he who should adopt such data for the purpose of forming an estimate of what would be done in a day, would find by night that he had made an egregious mistake. Log by log the wood has to be taken into the mill, placed on the bench, an estimate formed of the plan likely to be the most advantageous in cutting up; draught by draught it must be sawn; after each draught it must find its way back past the saw; board by board, or beam by beam, as sawn, must be laid aside; the saw must be sharpened now and again, perhaps taken off for repair, and replaced; the guide must be set for the various thicknesses and purposes the log may best suit. Many other matters equally necessary must be attended to; and by the close of the day the spectator may find, that although each man has faithfully performed his duty, the number of superficial feet sawn is not above a sixth, perhaps not an eighth, of what, at a hasty glance, he imagined it would be.

Amount of work to be performed.

From observations made at a number of mills, in various parts of the country, the author is disposed to state the following as a fair day's sawing, home-grown wood, for two saws with their full complement of hands:—

	Saw-measure.
Mixed scantlings, to suit general roofing, and trees of various sizes, ...	4000 to 5000 feet.
Lighter scantling, and boards, to suit general roofing, and trees of various sizes, ...	5000 to 6000 feet.
Boards exclusively, with little change of thickness, .	6000 to 7000 feet.
Plaster lath ($\frac{1}{3}$ inch thick), and light boards, . .	7000 to 8500 feet.

At such rates the expense per 100 superficial feet will be as under:—

Expense of sawing.

Superficial feet per day.	Water power.		Steam power.	
	At 16s per day	At 18s 8d per day.	At 22s per day.	At 24s 8d per day.
	per 100 ft.	per 100 ft.	per 100 ft.	per 100 ft.
4000	4¾d	5¾d	6¾d	7½d
4500	4¼d	5d	6d	6¾d
5000	4d	4½d	5¼d	6d
5500	3½d	4¼d	5d	5½d
6000	3¼d	3¾d	4½d	5d
6500	3d	3½d	4¼d	4¾d
7000	2¾d	3¼d	3¾d	4¼d
7500	2¾d	3d	3½d	4d
8000	2½d	3d	3½d	3¾d
8500	2¼d	2¾d	3¼d	3½d

Cost price of steam-engine.

Steam-engines adapted to the manufacture of timber differ widely in price, in durability, in power, and in finish. Two engines turned out by different makers, of the same power nominally, often differ much in their real power. Some firms, anxious to struggle into notice, give a good article at a very moderate price; others give a low-priced but inferior one; others give a good article at a fair price; while others, who have attained a name and established business, give a good article, making the buyer pay a good price for it, and something for the name besides. The following statement of prices charged by various firms may be found useful:—

Portable and fixed engines.

A. and B. supply well-finished engines, fixed and portable, having cylinder and boiler clothed with hair-felt, lagged with wood, and the whole covered over with sheet-iron. The boiler is multitubular, and requires extremely little fuel. The portable engines are placed on the boiler, and the whole mounted on four wheels, and supplied with two pairs drawing-shafts, and may be removed from any site, in a working state, at a few minutes' notice. Their fixed horizontal engines are erected on a foundation-plate of planed metal, and fitted with steam feed and exhaust pipes; have a cylindrical Cornish boiler of ample size and strength, &c. &c. Their prices are:—

Fixed.		Portable.					
Horse power.	Price.	Horse power.	Number of cylinders.	Diameter of cylinder.	Length of stroke.	Revolutions per minute.	Price.
8	£200	8	1	9 inches	12 inches	120	£230
...	...	8	2	6¼ „	10 „	120	250
10	240	10	1	10 „	14 „	110	270
...	...	10	2	7 „	12 „	120	290
12	280	12	2	7¾ „	12 „	120	335
14	320	14	2	8½ „	12 „	120	375
16	360	16	2	9 „	12 „	120	415
20	440	20	2	10 „	14 „	110	495

The above-mentioned engines, with their boilers, are complete in every way, and require nothing but water and fuel for active operations. The fly-wheel drives the saw pulley direct. The 8-horse power is suitable for only the lighter descriptions of work with two saws. An addition is made to the price of each when fitted with enlarged fire-box for the purpose of burning wood.

C. and D. supply high-pressure horizontal fixed steam-engines fitted with malleable iron crank-shafts, governor, and force-pump. And for

these they supply egg-ended boilers, and boiler mounting, consisting of one safety-valve, feed-valve, two gauge-cocks, &c. &c. Boilers made of best plate $\frac{3}{8}$ inch thick, as follow :— High-pressure engines.

Engines.				Boilers and Mounting.			Total cost of engine and boiler.
Horse power.	Diameter of cylinder.	Length of stroke.	Price.	Length of boiler.	Diameter of boiler.	Price.	
12	12 inches	24 inches	£96	18 feet	4½ feet	£54	£150
16	14 „	30 „	125	25 „	5 „	76	210
20	16 „	36 „	170	28 „	5 „	86	256
24	17 „	36 „	185	32 „	5 „	100	285
30	18 „	42 „	235	2 boilers, each 25 ft.	5 „	140	375

No driving-gear or boiler-funnel included.

E. and F. supply a portable steam-engine, with multitubular boiler, two fly-wheels, &c., complete; drives two saws without intermediate machinery; cylinder 10 inches diameter, 24 inches stroke—price £320.

G. and H. supply a fixed, high-pressure, steam-engine, 20-horse power, 14 inches cylinder, 30 inches stroke, 3½ ton fly-wheel, together with tubular boiler 10 feet long, 5½ feet diameter, and having 50 tubes, &c., the whole of first-class materials and workmanship, price £364. Such a one as this drives a vertical framé saw for logs 22 by 22 inches, a flooring and moulding machine, and two circular saws each 4 feet diameter.

I. and K. supply portable engines, with boilers felted, and lagged with wood :—

Cost of engine, and number of saws driven.

8-Horse power, 1 cylinder 10 inches diameter, 18 inches stroke, £180; drives 2 or 3 saws (circular).

10-Horse power, 2 cylinders, each 8 inches diameter, 12 inches stroke, £200; drives 2 or 3 saws.

12-Horse power, 1 cylinder 11 inches diameter, 16 inches stroke, £240; drives 4 or 5 saws.

These engines have each two fly-wheels, and the boilers have furnaces suitable for using waste wood as fuel. They also supply fixed engines, with suitable boilers, as under :—

8-Horse power, 1 cylinder 10 inches diameter, 18 inches stroke, £160; drives 2 or three saws.

10-Horse power, 1 cylinder 11 inches diameter, 24 inches stroke, £200; drives 4 saws.

12-Horse power, 1 cylinder 12 inches diameter, 24 inches stroke, £220; drives 4 saws.

16-Horse power, 1 cylinder 14 inches diameter, 24 inches stroke, £300; drives 4 or 5 saws.

20-Horse power, 1 cylinder 15 inches diameter, 30 inches stroke, £350; drives 6 saws.

The above are all high-pressure engines.

Engine for heavy work.

L. and M. supply a 50-horse power condensing steam-engine, cylinder 3 feet diameter, 4 feet stroke, having two boilers which fire with waste wood, price £850. The foundations, boiler buildings, and stalk cost £350 more. Drives 7 circular saws, 2 vertical frame saws admitting logs 18 to 30 inches diameter; and planing-machine for dressing boards.

The above are all *bona fide* statements by respectable firms in England and Scotland.

Vertical frame saw.

A vertical frame saw of fair quality and capabilities may be had for about £200, including fittings. One having, say a dozen saws in it, will cut up a log 18 to 20 inches square at the rate of 7 to 8 superficial feet per minute, if the motive power is good; but the time lost in placing and fixing the logs and saws, &c., will likely bring a day's work down to the rate of 4 to 5 feet per minute. These saws are economical in regard to the quantity of timber they waste in the operation of manufacture, and are well suited for cutting up large trees, or timber requiring the natural bends preserved. On the other hand, they are expensive to fit up; are ill suited for removing from place to place; require a large amount of motive power; and, generally, are less suited for cutting up home timber than the circular saw. In the manufacture of small trees, roofing, and such like, the circular is to be preferred far before them, if either must be alone.

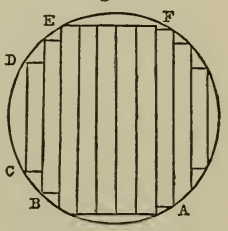
CHAPTER VI.

SAW-MEASURE, AND SALE-MEASURE.

Slabbing.

WHEN a round log is to be sawn into boards, it is necessary to run the saw along, and cut off a slab before the first clean board can be obtained; and whether the edge of each board is sawn straight by itself, or a number of them be straightened, while in the log, by taking a slab off each of other two sides, it gives a certain number of feet more sawing than there will be superficial feet disposable boards after the log is cut up. This will be better illustrated by means of fig. 5.

Fig. 5.



Let fig. 5 represent a cross section of a round log, 42 inches circumference, sawn into ten boards, each an inch thick. The superficial measurement of these boards is 98 feet, the log having been 12 feet long. The 98 feet disposable boards is termed the "sale-measure." The first slab, A B, in this case 6 inches broad, had to be removed, and, in order to expedite the work, the second and third slabs, C D and E F, were also removed. The ten boards were then sawn off one by one, and the five having vacancies at the edges were laid above each other on the bench, and squared up. It will thus be understood that in addition to the 98 feet of boards, there must have been a considerable number of feet more sawing before these slabs and rough edges could be all removed. The whole of these draughts added together are termed the "saw-measure." In this instance the slabbing and rinding, or straightening, measured 34 superficial feet, which, added to the 98 feet boards (sale-measure), make the "saw-measure" 132 superficial feet.

"Saw-measure" and "sale-measure."

OF THE EXPENSE OF SAWING TREES OF DIFFERENT SIZES.

The difference between saw-measure and sale-measure decreases as the circumference of the timber increases. This is exemplified by Table XIII.

TABLE XIII.—Showing the Number of Superficial Feet Slabbing in 1 Cubic Foot and in 100 Cubic Feet.

	Side of Square of Log being—								
	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.	12 in.
	feet.	feet.	feet.	feet.	feet.	feet.	feet.	feet.	feet.
1 cubic foot,	9	$7\frac{1}{5}$	6	$5\frac{1}{7}$	$4\frac{1}{2}$	4	$3\frac{3}{5}$	$3\frac{3}{11}$	3
100 cubic feet,	900	720	600	514·286	450	400	360	327·27	300

Note.—Rule for finding the quantity of slabbing in a cubic foot—Divide 36 by the side of the square expressed in inches; and for finding the quantity of slabbing in 100 cubic feet—Divide 3600 by the side of the square expressed in inches.

REMARKS ON TABLE XIII.

Amount of slabbing.

In the first line, the side of the square ($\frac{1}{4}$-girt) is given, and below each will be found the number of superficial feet slabbing in 1 cubic foot and 100 cubic feet of timber, of such $\frac{1}{4}$-girt. While there are 9 feet slabbing on a cubic foot of timber, the girth of which is 16 inches, there are only 3 feet slabbing where the girth is 48 inches. It will hence be observed that the girth of the trees must affect in a very material manner the expense of manufacturing a given number of cubic feet. Even in the case of foreign timber, which reaches this country in the squared log, it has all to be slabbed in order to remove sand and other extraneous matter from the boards.

Agreement regarding the rate at which timber shall be sawn may be arrived at in various ways. It may be at so much per 100 superficial feet saw-measure, or at so much for sale-measure; or it may be at so much per cubic foot for given dimensions of logs, and thicknesses of boards or planks.

TABLE XIV.—Showing the Number of Superficial Feet Sawing (exclusive of Slabbing) in one Cubic Foot Timber.

Loss by saw being	Thickness of each board or plank being—																					
	in. $\frac{3}{8}$	in. $\frac{1}{2}$	in. $\frac{5}{8}$	in. $\frac{3}{4}$	in. $\frac{7}{8}$	in. 1	in. $1\frac{1}{8}$	in. $1\frac{1}{4}$	in. $1\frac{3}{8}$	in. $1\frac{1}{2}$	in. $1\frac{5}{8}$	in. $1\frac{3}{4}$	in. $1\frac{7}{8}$	in. 2	in. $2\frac{1}{8}$	in. $2\frac{1}{4}$	in. $2\frac{3}{8}$	in. $2\frac{1}{2}$	in. $2\frac{5}{8}$	in. $2\frac{3}{4}$	in. $2\frac{7}{8}$	in. 3	in. $3\frac{1}{8}$
$\frac{1}{16}$ inch.	ft. $27\frac{3}{7}$	ft. $21\frac{1}{3}$	ft. $17\frac{1}{11}$	ft. $14\frac{10}{13}$	ft. $12\frac{4}{5}$	ft. $11\frac{5}{17}$	ft. $10\frac{2}{19}$	ft. $9\frac{1}{7}$	ft. $8\frac{8}{23}$	ft. $7\frac{11}{25}$	ft. $7\frac{1}{9}$	ft. $6\frac{15}{29}$	ft. $6\frac{6}{31}$	ft. $5\frac{5}{11}$	ft. $5\frac{17}{35}$	ft. $5\frac{7}{37}$	ft. $4\frac{13}{39}$	ft. $4\frac{23}{41}$	ft. $4\frac{29}{43}$	ft. $4\frac{13}{23}$	ft. $4\frac{4}{47}$	ft. $3\frac{15}{49}$	ft. $3\frac{13}{17}$
$\frac{3}{32}$,,	$25\frac{3}{5}$	$20\frac{4}{19}$	$16\frac{1}{23}$	$14\frac{2}{5}$	$12\frac{31}{37}$	$10\frac{34}{35}$	$9\frac{11}{13}$	$8\frac{8}{43}$	$8\frac{8}{47}$	$7\frac{9}{17}$	$6\frac{14}{55}$	$6\frac{30}{59}$	$6\frac{8}{21}$	$5\frac{49}{57}$	$5\frac{29}{71}$	$5\frac{8}{25}$	$4\frac{58}{79}$	$4\frac{58}{83}$	$4\frac{36}{87}$	$4\frac{20}{91}$	$4\frac{4}{95}$	$3\frac{28}{33}$	$3\frac{75}{103}$
$\frac{1}{8}$,,	24	$19\frac{1}{5}$	16	$13\frac{5}{7}$	12	$10\frac{8}{9}$	$9\frac{3}{5}$	$8\frac{8}{11}$	8	$7\frac{5}{13}$	$6\frac{2}{7}$	$6\frac{2}{5}$	6	$5\frac{11}{17}$	$5\frac{1}{3}$	$5\frac{1}{19}$	$4\frac{4}{5}$	$4\frac{4}{7}$	$4\frac{4}{11}$	$4\frac{4}{23}$	4	$3\frac{21}{25}$	$3\frac{8}{13}$
$\frac{5}{32}$,,	$22\frac{19}{17}$	$18\frac{2}{7}$	$15\frac{9}{25}$	$13\frac{7}{25}$	$11\frac{7}{11}$	$10\frac{1}{37}$	$9\frac{11}{41}$	$8\frac{24}{45}$	$7\frac{11}{45}$	$7\frac{13}{53}$	$6\frac{12}{57}$	$6\frac{18}{61}$	$5\frac{52}{65}$	$5\frac{33}{69}$	$5\frac{9}{73}$	$4\frac{76}{77}$	$4\frac{60}{81}$	$4\frac{44}{85}$	$4\frac{28}{89}$	$4\frac{13}{89}$	$3\frac{33}{97}$	$3\frac{81}{101}$	$3\frac{69}{105}$
$\frac{3}{16}$,,	$21\frac{1}{3}$	$17\frac{5}{11}$	$14\frac{10}{13}$	$12\frac{4}{5}$	$11\frac{5}{17}$	$10\frac{2}{19}$	$9\frac{1}{7}$	$8\frac{8}{23}$	$7\frac{11}{25}$	$7\frac{1}{9}$	$6\frac{18}{29}$	$6\frac{6}{31}$	$5\frac{9}{11}$	$5\frac{17}{35}$	$5\frac{7}{37}$	$4\frac{13}{39}$	$4\frac{28}{41}$	$4\frac{20}{43}$	$4\frac{12}{45}$	$4\frac{4}{47}$	$3\frac{45}{49}$	$3\frac{13}{17}$	$3\frac{8}{9}$

REMARKS ON TABLE XIV.

In the uppermost line of figures, the various thicknesses of boards or planks from $\frac{3}{8}$ inch to $3\frac{1}{8}$ inches are given. In the left-hand column are given the various thicknesses likely to be cut out at each draught by various kinds of saws, or saw-draught with extra allowance of thickness on each board. The body of the Table shows the number of superficial feet sawing in a cubic foot. Thus, if a cubic foot of squared timber is to be sawn into boards, each $\frac{3}{8}$ inch thick, by a saw cutting out $\frac{1}{16}$ inch at each draught, there will be $27\frac{3}{7}$ superficial feet sawing in the operation. If it is to be sawn into planks each $3\frac{1}{8}$ inches thick, there will be only $3\frac{13}{17}$ feet sawing.

If saw-measure cost 2s. 6d. per 100 superficial feet, the expense of sawing a cubic foot into boards, each $\frac{3}{8}$ inch thick, from a round log, 24 inches circumference, saw cutting out $\frac{3}{32}$ inch, will be 9·48d. Thus:

Table XIII., under 6 inches side of square, gives 6 superficial feet slabbing in a cubic foot; and

Table XIV., under $\frac{3}{8}$ inch, line $\frac{3}{32}$ inch, gives $25\frac{3}{5}$ superficial feet slabbing in a cubic foot—being $31\frac{3}{5}$ feet sawing, at 2s. 6d. per 100 feet = 9·48d. If the log is 48 inches circumference, and sawn into planks each $3\frac{1}{8}$ inches thick, then the expense of sawing is: Slabbing, 3 feet; sawing after slabbing, $3\frac{75}{103}$ feet; in all, $6\frac{75}{103}$ feet, at 2s. 6d. per 100 = 2·01d. per cubic foot. In other words, the sawing of a cubic foot costs about $9\frac{1}{2}$d. in the former case, and about 2d. in the latter.

OF THE LOSS OF TIMBER BY SAWS OF VARIOUS THICKNESSES.

The vertical frame saw cuts out about $\frac{3}{32}$ inch at every draught, and the circular saw $\frac{1}{8}$ to $\frac{5}{32}$ inch. A large quantity of timber thus runs to waste in the operation of manufacture. The amount of this loss demands consideration.

TABLE XV.—Showing the SOLID CONTENT of the WOOD DESTROYED by a Saw in Sawing 1 Superficial Foot and 100 Superficial Feet.

	Thickness of saw-draught being—											
	$\frac{1}{64}$ in.	$\frac{1}{32}$ in.	$\frac{3}{64}$ in.	$\frac{1}{16}$ in.	$\frac{5}{64}$ in.	$\frac{3}{32}$ in.	$\frac{7}{64}$ in.	$\frac{1}{8}$ in.	$\frac{9}{64}$ in.	$\frac{5}{32}$ in.	$\frac{11}{64}$ in.	$\frac{3}{16}$ in.
1 Superficial Ft.	$\frac{1}{768}$ ft.	$\frac{1}{384}$ ft.	$\frac{1}{256}$ ft.	$\frac{1}{192}$ ft.	$\frac{5}{768}$ ft.	$\frac{1}{128}$ ft.	$\frac{7}{768}$ ft.	$\frac{1}{96}$ ft.	$\frac{3}{256}$ ft.	$\frac{5}{384}$ ft.	$\frac{11}{768}$ ft.	$\frac{1}{64}$ ft.
100 Superficial Ft.	ft. in. pt. 0 1 $6\frac{3}{4}$	ft. in. pt. 0 3 $1\frac{1}{2}$	ft. in. pt. 0 4 $8\frac{1}{4}$	ft. in. pt. 0 6 3	ft. in. pt. 0 7 $9\frac{3}{4}$	ft. in. pt. 0 9 $4\frac{1}{2}$	ft. in. pt. 0 10 $11\frac{1}{4}$	ft. in. pt. 1 0 6	ft. in. pt. 1 2 $0\frac{3}{4}$	ft. in. pt. 1 3 $7\frac{1}{2}$	ft. in. pt. 1 5 $2\frac{1}{4}$	ft. in. pt. 1 6 9

REMARKS ON TABLE XV.

Waste by saw-draught.

The upper line gives the thickness of the saw-draught. Take, as an instance, that of $\frac{1}{16}$ inch; it will be observed that the waste of timber, by sawdust, in sawing a superficial foot, is $\frac{1}{192}$ cubic foot; and upwards of $\frac{1}{2}$ cubic foot ($6\frac{1}{4}$ inches) on 100 superficial feet. Where the thickness of the saw-draught is $\frac{3}{32}$ inch (that wasted by the arm-saw), the loss is $\frac{1}{128}$ solid foot on a superficial foot, and upwards of $\frac{3}{4}$ solid foot on 100 superficial feet sawing. In the case of a draught $\frac{5}{32}$ inch (that by a common circular saw cutting up scantlings, &c.), the waste is $\frac{5}{384}$ inch, and upwards of $1\frac{1}{4}$ cubic feet respectively. The difference in loss between the $\frac{3}{32}$ inch wasted by the arm-saw, and that of the $\frac{5}{32}$ inch wasted by the common circular saw,

Advantage by cutting up near plantation.

amounts to upwards of $\frac{1}{2}$ cubic foot in sawing 100 superficial feet. This is no slight matter in cutting up valuable timber, and even on any timber, if the arm-saw can cut it up where it grew, and it has to be transported a considerable distance to be operated on by machinery. Besides the mere loss by the difference of saw-draught, it has already been shown (Table VI., with Remarks) that the dry manufactured inch boards weighed only one-third of the green round timber from which they were sawn.

Table XVI. shows the loss in a cubic foot, by saws cutting out thicknesses ranging from $\frac{1}{16}$ to $\frac{3}{16}$ inch at each draught, in sawing boards and planks from $\frac{1}{3}$ to 3 inches thick; but the loss by the operation of slabbing is not included.

TABLE XVI.—Showing the Quantity of Wood lost in Sawing a Cubic Foot into Boards or Planks.

Thickness of saw-draught.	Thickness of board being																					
	in. $\frac{1}{3}$	in. $\frac{3}{8}$	in. $\frac{1}{2}$	in. $\frac{5}{8}$	in. $\frac{3}{4}$	in. $\frac{7}{8}$	in. 1	in $1\frac{1}{8}$	in. $1\frac{1}{4}$	in. $1\frac{3}{8}$	in. $1\frac{1}{2}$	in. $1\frac{5}{8}$	in. $1\frac{3}{4}$	in. $1\frac{7}{8}$	in. 2	in. $2\frac{1}{8}$	in. $2\frac{1}{4}$	in. $2\frac{3}{8}$	in. $2\frac{1}{2}$	in. $2\frac{5}{8}$	in. $2\frac{3}{4}$	in. $2\frac{7}{8}$	in. 3
$\frac{2}{32}$ inch.	$\frac{3}{19}$	$\frac{1}{7}$	$\frac{1}{9}$	$\frac{1}{11}$	$\frac{1}{13}$	$\frac{1}{15}$	$\frac{1}{17}$	$\frac{1}{19}$	$\frac{1}{21}$	$\frac{1}{23}$	$\frac{1}{25}$	$\frac{1}{27}$	$\frac{1}{29}$	$\frac{1}{31}$	$\frac{1}{33}$	$\frac{1}{35}$	$\frac{1}{37}$	$\frac{1}{39}$	$\frac{1}{41}$	$\frac{1}{43}$	$\frac{1}{45}$	$\frac{1}{47}$	$\frac{1}{49}$
$\frac{3}{32}$,,	$\frac{9}{41}$	$\frac{1}{6}$	$\frac{3}{19}$	$\frac{3}{23}$	$\frac{1}{8}$	$\frac{3}{31}$	$\frac{3}{35}$	$\frac{1}{13}$	$\frac{3}{43}$	$\frac{3}{47}$	$\frac{1}{17}$	$\frac{3}{55}$	$\frac{3}{59}$	$\frac{1}{21}$	$\frac{3}{67}$	$\frac{3}{71}$	$\frac{1}{25}$	$\frac{3}{79}$	$\frac{3}{83}$	$\frac{1}{29}$	$\frac{3}{91}$	$\frac{3}{95}$	$\frac{1}{33}$
$\frac{4}{32}$,,	$\frac{3}{11}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{11}$	$\frac{1}{12}$	$\frac{1}{13}$	$\frac{1}{14}$	$\frac{1}{15}$	$\frac{1}{16}$	$\frac{1}{17}$	$\frac{1}{18}$	$\frac{1}{19}$	$\frac{1}{20}$	$\frac{1}{21}$	$\frac{1}{22}$	$\frac{1}{23}$	$\frac{1}{24}$	$\frac{1}{25}$
$\frac{5}{32}$,,	$\frac{15}{47}$	$\frac{5}{17}$	$\frac{5}{21}$	$\frac{1}{5}$	$\frac{5}{29}$	$\frac{5}{33}$	$\frac{5}{37}$	$\frac{5}{41}$	$\frac{1}{8}$	$\frac{5}{49}$	$\frac{5}{53}$	$\frac{5}{57}$	$\frac{5}{61}$	$\frac{1}{13}$	$\frac{5}{69}$	$\frac{5}{73}$	$\frac{5}{77}$	$\frac{5}{81}$	$\frac{1}{17}$	$\frac{5}{89}$	$\frac{5}{93}$	$\frac{5}{97}$	$\frac{5}{101}$
$\frac{6}{32}$,,	$\frac{9}{25}$	$\frac{1}{3}$	$\frac{3}{11}$	$\frac{3}{13}$	$\frac{1}{5}$	$\frac{3}{17}$	$\frac{3}{19}$	$\frac{1}{7}$	$\frac{3}{23}$	$\frac{3}{25}$	$\frac{1}{9}$	$\frac{3}{29}$	$\frac{3}{31}$	$\frac{1}{11}$	$\frac{3}{35}$	$\frac{3}{37}$	$\frac{1}{13}$	$\frac{3}{41}$	$\frac{3}{43}$	$\frac{1}{15}$	$\frac{3}{47}$	$\frac{3}{49}$	$\frac{1}{17}$

Table XVII. brings out very distinctly the difference between the produce in boards of a piece of timber manufactured by the vertical frame saw cutting out $\frac{3}{32}$ inch, and its produce when manufactured by an extra-thick, or widely-set circular, cutting out $\frac{3}{16}$ at each draught.

TABLE XVII.—(1.) The Quantity of Timber which, by a Saw cutting out $\frac{3}{16}$ inch, will give 100 Superficial Feet Boards, will, by a Saw cutting out $\frac{3}{32}$ inch, give as per line marked A. (2.) The Quantity which, by a Saw cutting out $\frac{3}{32}$ inch, will give 100 Feet Boards, will, by a Saw cutting out $\frac{3}{16}$ inch, give as per line marked B.

Thickness of board,	inch. $\frac{1}{3}$	inch. $\frac{3}{8}$	inch. $\frac{1}{2}$	inch. $\frac{5}{8}$	inch. $\frac{3}{4}$	inch. $\frac{7}{8}$	inch. 1	inch. $1\frac{1}{8}$	inch. $1\frac{1}{4}$	inch. $1\frac{3}{8}$	inch. $1\frac{1}{2}$	inch. $1\frac{5}{8}$
A,.....	$121\frac{3}{41}$	120	$115\frac{1}{19}$	$113\frac{1}{23}$	$111\frac{1}{9}$	$109\frac{21}{31}$	$108\frac{4}{7}$	$107\frac{9}{13}$	$106\frac{2}{43}$	$106\frac{18}{47}$	$105\frac{15}{17}$	$105\frac{5}{11}$
B,.....	82	$83\frac{1}{3}$	$86\frac{4}{11}$	$88\frac{6}{13}$	90	$91\frac{3}{17}$	$92\frac{2}{19}$	$92\frac{6}{7}$	$93\frac{11}{23}$	94	$94\frac{4}{9}$	$94\frac{24}{29}$

Table XVII.—*Continued.*

Thickness of board, . .	inch. $1\frac{3}{4}$	inch. $1\frac{7}{8}$	inch. 2	inch. $2\frac{1}{8}$	inch. $2\frac{1}{4}$	inch. $2\frac{3}{8}$	inch. $2\frac{1}{2}$	inch. $2\frac{5}{8}$	inch. $2\frac{3}{4}$	inch. $2\frac{7}{8}$	inch. 3
A,.....	$105\frac{5}{59}$	$104\frac{16}{21}$	$104\frac{32}{67}$	$104\frac{16}{71}$	$104\frac{8}{23}$	$103\frac{63}{79}$	$103\frac{63}{77}$	$103\frac{13}{29}$	$103\frac{9}{17}$	$103\frac{3}{19}$	$103\frac{1}{33}$
B,.....	$95\frac{5}{31}$	$95\frac{5}{11}$	$95\frac{5}{7}$	$95\frac{35}{37}$	$95\frac{5}{6}$	$96\frac{14}{41}$	$96\frac{1}{4}$	$96\frac{2}{3}$	$96\frac{13}{22}$	$96\frac{46}{49}$	$97\frac{127}{145}$

REMARKS ON TABLE XVII.

Circular saw and vertical frame saw compared.

It will be observed from this Table, that if a log of wood give 100 feet of boards, each $\frac{1}{2}$ inch thick, by the circular saw, it will give $115\frac{15}{19}$ by the vertical frame saw. Were these boards to be sold for 8s. 4d. per 100 feet, the produce of the log, worth only the 8s. 4d. by the former, would be worth 9s. $7\frac{3}{4}$d. by the latter means of manufacture. Again, a log producing 100 feet $\frac{1}{2}$ inch by the vertical frame saw, would only give $86\frac{4}{11}$ feet by the circular; and the value of the produce would be 8s. 4d. and 7s. $2\frac{1}{4}$d. respectively. The difference, however, is more as between the working of the circular and vertical frame saw of machinery, than as between the former and the arm-saw. It is practically impossible to go so straight forward, and with so clean a cut, with the hand as by machinery.

CHAPTER VII.

EXPENSE OF, AND LOSS IN, SAWING WOOD FOR DIFFERENT PURPOSES.

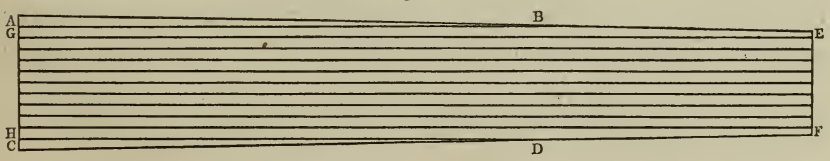
TIMBER is usually sawn into one or other of the following forms permanently—viz.,

Rafters of uniform thickness, but not parallel-edged.
Rafters and joists of uniform thickness, and parallel-edged.
Boards and planks of uniform thickness, but not parallel-edged.
Boards and planks of uniform thickness, and parallel-edged.

Loss by tapering timber.

Everybody knows that the natural form of a tree is to taper more or less gradually from the root to the top. This natural decrease in diameter leads to a considerable loss of timber, in whatever way or for whatever purpose a tree may be cut up; but there are certain purposes which lead to less loss than others. Let fig. 6 represent a tapering log sawn into boards. The outside boards or slabs A B and

Fig. 6.

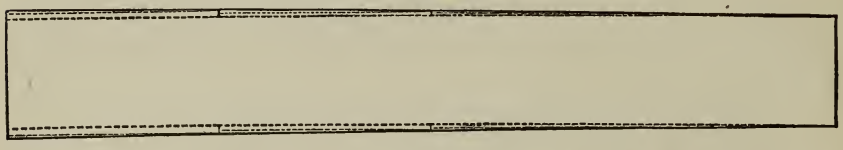


C D, although fully as thick as the others towards the root A C, get so thin by the time they reach B D that they are of little value; and even the two next to them, from B to E and D to F, taper so that they require to be cut off at B D, and reduced to a uniform thickness before they are useful. In addition to the loss arising from this extra labour, there is this further loss, that short boards do not fetch so high a price as long ones. If a carpenter require a set of boards, each 7 feet long, and the log fig. 6 be 21 feet long, he will have three lengths in each board running the entire length of the log; but if the two boards which it was necessary to cut at B D are only 13½ feet long from B

to G and D to H, then he loses $6\frac{1}{2}$ feet on each of them, and may have no immediate use for such lengths, consequently may have to dispose of them at a reduced price, or transport them at some inconvenience to his next job. He also runs a risk of the wedge-shaped pieces A B, B E, and C D, D F being of no use to him.

If the log fig. 6 is of like breadth and thickness, then each board will gradually decrease in breadth from the root to the top. This also is a source of more or less loss, according to the purpose to which it may be necessary to apply it. Let fig. 7 represent such board 21 feet long, 12 inches broad at one end, and 9 inches at the other.

Fig. 7.



If this board can be used as sawn from the log, there will be 18 feet $4\frac{1}{2}$ inches superficial measure in it. If it must be the entire length of the log, and parallel-edged, the small end will limit the area to $15\frac{3}{4}$ feet, thus occasioning a loss of 2 feet $7\frac{1}{2}$ inches superficial measure.

Tapering timber to be cut in short lengths.

If it must be parallel-edged, but will suit the purpose although cut into four pieces, then each of these may be rendered so, independent of the others, and the superficial area of the whole will be 17 feet $8\frac{1}{2}$ inches, the loss being only 8 inches.

Home-grown timber not die-square in scantlings.

Unless under special agreement, home-grown timber, when being manufactured into scantlings, is not sawn die-square, but in accordance with the rule, "One-fourth of the girth is reckoned the side of the square." There are thus vacancies at the angles in scantlings. Take

Fig. 8.

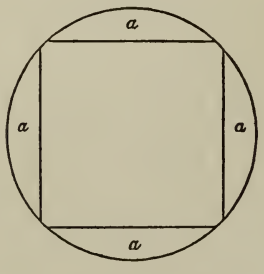
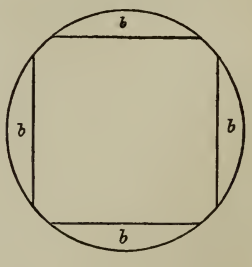


Fig. 9.



a round log 12 feet long, and let fig. 8 represent the thick or root end of it, 48 inches circumference, and fig. 9 the smaller end, 44 inches circumference. The solid content by Rule I. is 11 feet and 3 parts, girthed in the middle.

If sawn into a parallel-sided beam, the thickness at the small end (fig. 9) will limit the dimensions at the thick end, and the solid content of the beam will be 10 feet 1 inch, being a loss, in saw-draught and slabs *a a a a*, *b b b b*, of $11\frac{1}{4}$ inches—nearly a cubic foot, less what can be produced from the slabs.

Smaller end limits dimensions of beam.

Should the tree taper more rapidly, and the smaller end be only 40 inches circumference, then the solid content, taking the girth at the middle, as usual, will be $10\frac{1}{12}$ cubic feet, and, sawn into a parallel-sided beam, the solid content will be only $8\frac{1}{3}$ cubic feet, being a loss of $1\frac{3}{4}$ solid feet. Hence it will be observed that trees in the round log decrease in value per cubic foot as they decrease more rapidly in diameter towards the point.

The more rapid taper the more loss.

Fig. 10.

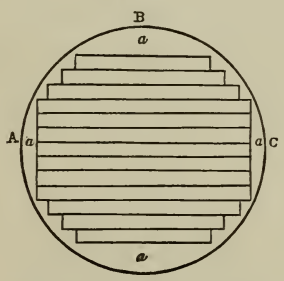
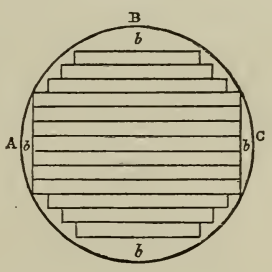


Fig. 11.



Let figs. 10 and 11 represent the thicker and smaller ends of a log of same dimensions as that of figs. 8 and 9. Sawn by a circular saw, cutting out $\frac{5}{32}$ inch at each draught, the produce in boards, each $\frac{3}{4}$ inch thick, but not parallel-edged, will be 150 superficial feet, each board measured across the middle. On paper, the four slabs *a a a a*, *b b b b* appear large, but what with bends and irregularities, they come in practice to be much less.

Should the tree taper more rapidly, and the circumference be only

Fig. 12.

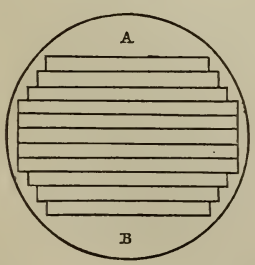
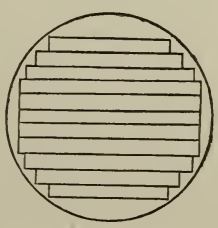


Fig. 13.



40 inches at the small end, then the boards will appear as in figs. 12 and 13, and their superficial area be only 125 feet.

It will be shown by-and-by that, on an average, 7 feet 6 inches $7\frac{1}{2}$ parts round timber produces 100 superficial feet of $\frac{3}{4}$-inch boards, sawn by a circular saw cutting out $\frac{5}{32}$ inch at each draught. The tree of figs. 10 and 11 gives 4 feet more than this proportion, the thickness at the root and smaller ends being nearly the same. On the other hand, this tree of figs. 12 and 13 gives only 125 feet instead of $133\frac{1}{2}$, which it ought to have done, being a loss of $8\frac{1}{2}$ feet by its rapidly tapering form. No doubt the larger slabs A B, fig. 12, will give two additional boards, but they will be only half the length of the log, will taper rapidly, and hence will bring an inferior price. In fact, all the boards will taper rapidly, and consequently will be of less value than those of tree figs. 10 and 11, as explained and illustrated at fig. 7.

Figs. 10-13 illustrate the method pursued in cutting trees into boards where these do not require to be parallel-edged. Where they require to be parallel, the produce is very considerably lessened. Let figs. 14 and 15 represent the thicker and smaller ends of a log 12 feet long, girths 48 and 44 inches respectively. The

Fig. 14.

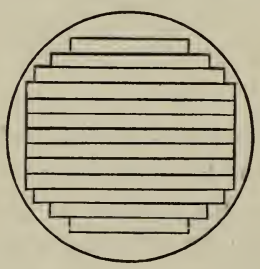
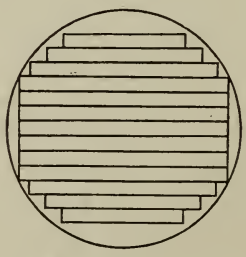


Fig. 15.



smaller end (fig. 15) limits the breadth of each board, and the area of the whole in this case is 146 feet. This is 4 feet less than if the log had been sawn same as that of figs. 10 and 11.

Fig. 16.

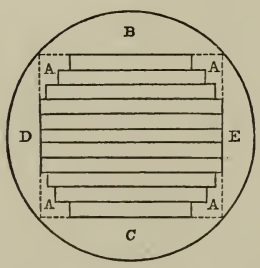
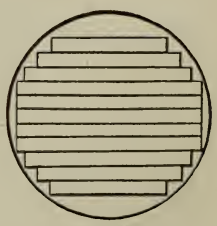


Fig. 17.



A log tapering more rapidly, say from 48 inches circumference at base to 40 inches 12 feet up, will show a different result, as observable by figs.

16 and 17. The area of the boards, figs. 16 and 17, is only 112 feet, parallel-edged, being 13 feet less than the boards of figs. 12 and 13 not parallel-edged, but from a tree of like dimensions, and they measure 21½ feet less than they would have done if sawn from a log with as little taper as that of figs. 14 and 15. The wood at the four angles A A A A, fig. 16, is quite lost, the saw running through it in all directions. The large slabs B C D E will be of use for inferior or secondary purposes, but the fewer of these the better for the seller. When of sufficient size for the purpose, they are usually sawn into sarking for slater-work, but their lengths and breadths in home timber are commonly very irregular. Another use frequently made of them is lining for the sides of temporary wooden erections. Uses of slabs.

Frequently quantities of boards are required all one breadth. These cut up a large quantity of round timber. The nearer to the specified breadth trees can be got for them, so much the better. Let figs. 18 and 19 represent a log 12 feet long, 48 inches circumference at the thicker end, and 44 inches at the other. Here there

Fig. 18.

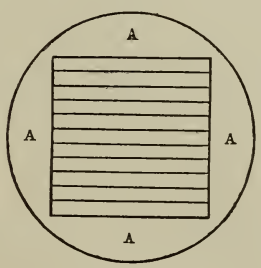
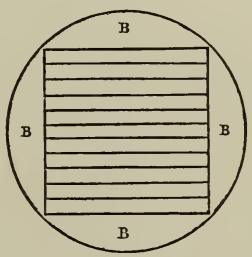


Fig. 19.



are 110 superficial feet parallel-edged ¾-inch boards, each 10 inches broad, being at the rate of 100 superficial feet from 10 feet 0 inches 2 parts, cubic, round timber. The four large slabs, A A A A, B B B B, will give some 30 feet additional boards if the tree have been straight grown. The most advantageous plan is to cut the slabs into thin boards—say ½ inch.

When trees taper rapidly towards the point, the quantity of parallel-edged boards obtainable from them is proportionally small. Let figs. 20 and 21 (page 58) represent a log 12 feet long, 48 inches circumference at the base, and 40 inches at the top. The area of the parallel-edged boards there represented is 90 feet, thus showing that 11⅑ solid feet round timber of such dimensions is required to produce 100 superficial feet parallel-edged boards; while in the case of a log

same length, only $1\frac{1}{4}$ inches more diameter at top (figs. 18 and 19), it required but 10 feet $\frac{1}{6}$ inch solid. The longer the logs, the greater the

Fig. 20.

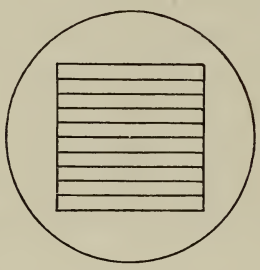
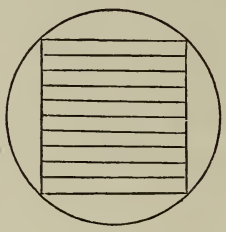


Fig. 21.



difference; and the more rapid the taper, the less value both boards and slabs.

Adverting once more to figs. 10 and 11 in illustration of the terms "saw-measure" and "sale-measure." The side of the square of the log is $11\frac{1}{2}$ inches. The three slabs A, B, and C, have to be removed in succession before a board is sawn; this, with the straightening of the six narrower boards, gives about 34 superficial feet sawing, which, added to the 150 feet of boards ("sale-measure"), makes 184 feet "saw-measure," by the circular saw cutting out $\frac{5}{32}$ inch at each draught.

Loss by crooked trees.

If the trees in a plantation happen to be crooked, the loss in cutting them up for house-building purposes is great in proportion to their deviation from a straight line, and to the lengths required. Let fig. 22 represent a log 12 feet long, A the base, 48 inches circumference, B the smaller end, 44 inches circumference, the dotted line *a b* the saw-mill bench on which it rests, *c d* an upward bend of 3 inches from the bench. The solid content of a log of these dimensions is 11 feet $\frac{1}{4}$ inch. If straight, and sawn by the ordinary rule, it will produce a parallel-sided beam 11 by 11 inches, the solid content of which is $10\frac{1}{12}$ feet (see figs. 8 and 9). Here, having this bend of 3 inches at *c d*, it can produce a parallel-sided beam only 11 by $8\frac{1}{2}$ inches, the solid content of which is 7 feet $9\frac{1}{2}$ inches, being 2 feet $3\frac{1}{2}$ inches less than if the log had been straight. The upper slab A B contains wood for additional boards, but the lengths and breadths will be very irregular, while the under-slab C D will be almost valueless.

Fig. 23 represents an end view of such a tree, with its produce as a parallel-sided beam. The circle *a b c d* represents the thicker end, and the circle *a e f g* the smaller end, both resting on the same level; the circle *h i k l* the middle of the log, at the bend, elevated 3 inches

Fig. 22.

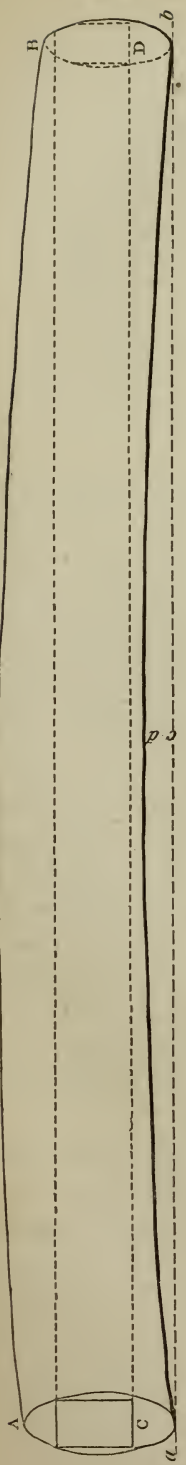


Fig. 25.

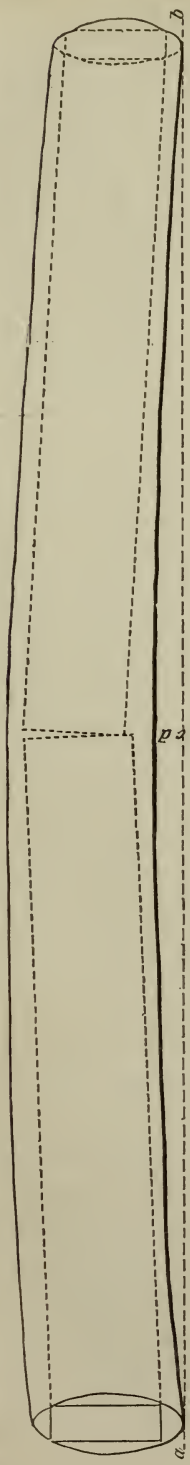


Fig. 26.

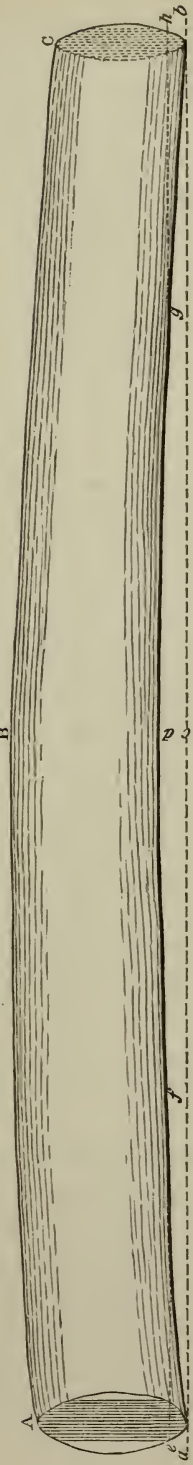
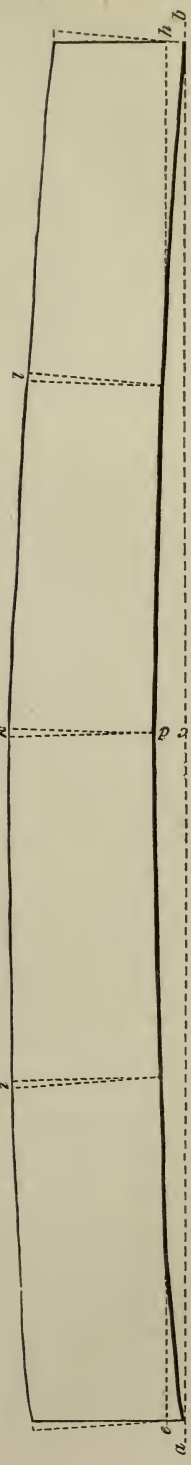


Fig. 29.



above the level of the two ends. The dotted parallelogram *m n o p* represents the beam produced from the log.

Fig. 23.

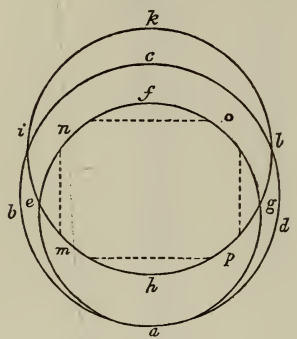


Fig. 24.

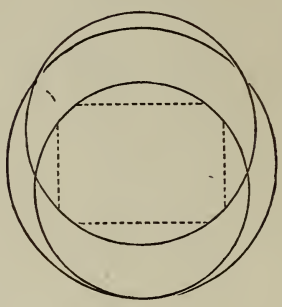


Fig. 24 represents an end view of a log 12 feet long, the girths 48, 44, and 40 inches. The upward bend at the middle is 3 inches (same as that of fig. 23). The solid content of the round timber is $10\frac{1}{12}$ cubic feet, but the parallel-sided beam which can be produced from it is only 10 by 7 inches, and the solid content $5\frac{5}{6}$ feet, being a loss of $4\frac{1}{4}$ feet, less value of slabs. A bend extending to 6 inches in the middle would lessen the beam of fig. 23 to 11 by 5 inches, being $4\frac{7}{12}$ cubic feet; and the beam of fig. 24 to 10 by 4 inches, being $3\frac{1}{3}$ cubic feet, or less than one-third of the round timber!

Crooked trees to be cut into short sections.

The most economical method for crooked trees (except for purposes to be noticed presently) is to cut them into short lengths, and at the bends. Let fig. 25 represent a log 12 feet long, 48 and 44 inches circumference (same as that of fig. 22). If severed at the middle, the thicker end will produce a beam $11\frac{1}{4}$ by $11\frac{1}{4}$ inches = 5 feet $3\frac{1}{4}$ inches, and the smaller end a beam $10\frac{3}{4}$ by $10\frac{3}{4}$ inches = 4 feet $9\frac{3}{4}$ inches, being in all $10\frac{1}{12}$ cubic feet; and even should the smaller end of the tree be allowed to limit the dimensions of the thicker end, the gross produce of the log will be 9 feet $7\frac{1}{2}$ inches, in place of 7 feet $9\frac{1}{2}$ inches, as per fig. 22.

Uses of crooked trees.

Although crooked timber trees are generally highly objectionable when required for house-building and like purposes, in the case of larch for boatskin, and in that of hardwood for implements, &c., a single bend or crook in a log enhances its value, and care must be taken in cutting it up not to destroy such bend in any way. Let fig. 26 represent a round larch log 12 feet long, girth at A 48 inches, at B 46 inches, and at C 44 inches, having an upward bend of 3 inches at *c d*. Were such log to be cut up by the circular saw, the first operation of

the saw-miller would be to run the saw along the line *e f g h* in order to steady the log on the bench. This operation would of itself waste a portion of the timber, but what is worse, it would very considerably lessen the value of the remainder, as it would occasion the loss of part of the bend, which is valuable in boat-building. The best method is to have it cut up by the vertical frame saw, which will leave each board entire. No doubt, cutting by such means is more expensive, but the saving in the thickness of the saw-draught, the greater exactness attainable in sawing, and the retaining of the bend complete, will amply compensate the loss. The area of the boards is found by measuring across each at *d* B. Fig. 27 represents the thicker end (A), and fig. 28 the smaller end (C), of log fig. 26 cut into boards each $\frac{3}{4}$ inch thick.

Circular saw unsuitable for cutting crooked timber.

Vertical frame saw to be used.

Fig. 27.

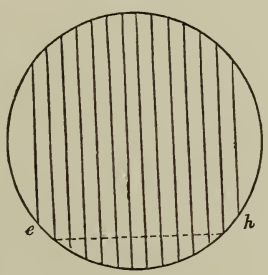
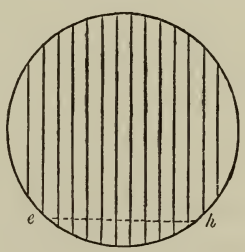


Fig. 28.



All under the dotted lines *e h* would be sawn off each *end* in cutting up the log by the circular saw, but the vertical frame saw would give each board the whole breadth.

If the purpose to which boards are to be applied admits of their being cut into short lengths, the evils arising from crooked timber are almost obviated. Let fig. 29 represent the middle board of fig. 26 cut into 4 pieces each 3 feet long. The reader, on placing a ruler along the edge of each piece by itself, will observe that the loss in straightening will be very small. The party cutting up the timber will require to give each log a certain allowance of additional length, otherwise the loss by the angular pieces *i k l* at the end of each short board will make them too short.

If one crook or bend in a log occasion loss in house-building, much more will two be productive of it, more especially if the first bend is, say, to northward, and the second to the east.

One crook ill, two crooks worse.

Let fig. 30 represent a view of a log 12 feet long; *a b c d* the circumference at base, 48 inches; *e f g h* the circumference at 3 feet from base, 47 inches, bent 3 inches off a straight line drawn from base to

the middle of the log; *i k l m* the circumference at 9 feet up, 45 inches, bent 3 inches off a straight line drawn from base to middle, thence to

Fig. 30.

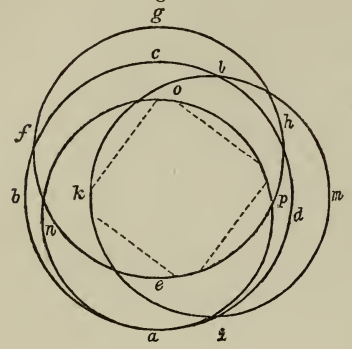
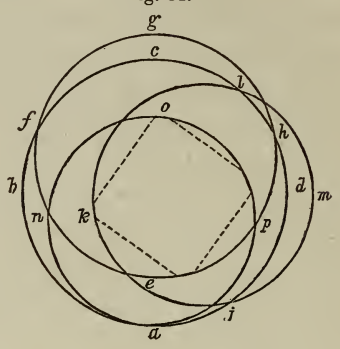


Fig. 31.



smaller end; *a n o p* the circumference at the smaller end, 44 inches. In other words, the tree is supposed to bend 3 inches towards the north at 3 feet from base, thence returning at 6 feet up to stand perpendicular with the base. It is then supposed to take a like bend of 3 inches eastward at 9 feet up, returning at 12 feet up to the same perpendicular as the middle and base. The solid content of the round log is 11 feet $\frac{1}{4}$ inch. Had it been straight, the solid content of the beam obtainable from it would have been $10\frac{1}{12}$ feet (*vide* figs. 8 and 9, with remarks). Had there been only one bend of 3 inches, the solid content of the beam obtainable from it would have been 7 feet $9\frac{1}{2}$ inches (*vide* figs. 22 and 23, with remarks). Here, owing to these two bends, each 3 inches, a beam of $8\frac{1}{2}$ by $8\frac{1}{2}$ inches only can be obtained, $= 6\frac{3}{144}$ feet. There is thus a loss of 1 foot $9\frac{1}{4}$ inches as compared with the product of the log with one bend, and of 4 feet $\frac{3}{4}$ inch as compared with the product of the straight log of like dimensions. The two bends will render at least half the solid content of the slabs practically useless for anything else than firewood, and the other half will not be worth half as much as slabs produced from a straight log.

Amount of loss by crooked timber.

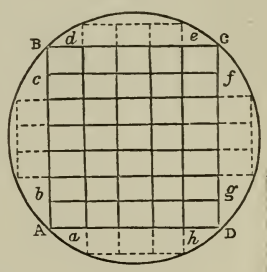
Fig. 31 represents a view of a log 48 inches circumference at base, 44 inches at 6 feet up, and 40 inches at the smaller end, 12 feet up. Here the mean girth is 44 inches, the solid content of the round log $10\frac{1}{12}$ feet, and the solid content of the squared beam 4 feet $4\frac{1}{2}$ inches. The bends are supposed to be the same as those of fig. 30.

By the time an attentive reader has advanced thus far, he will be able to form something like an adequate conception of the loss by crooked timber for all save a few purposes. Narrow belts of trees, small plantations, and ground much exposed to sweeping north-westerly breezes, produce most of this.

Loss by sawing trees into small pieces.

The loss arising from sawing timber into boards has already been shown (*vide* Tables XV. and XVI., with remarks). There is another source of more or less loss—viz., when a number of small pieces require to be sawn from a log. If the quality requires to be good, it is highly probable that they will require to be sawn from trees of larger size. The timber must first be sawn into planks of the requisite thickness, and these again sawn into the required breadths. Let fig. 32 represent the smaller end of a log 12 feet long, 51 inches circumference at the middle, and 48 inches at the point shown. The solid content of the round log is 13 feet $6\frac{1}{2}$ inches, and the solid content of the squared beam which can be produced from it, the smaller end limiting the dimensions throughout, is 12 feet, exclusive of four good useful slabs.

Fig. 32.



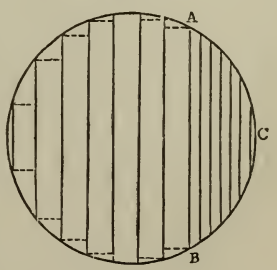
Economical method of sawing large logs into pieces of small size.

Suppose such a log to be sawn into slate laths, each 2 by $1\frac{1}{2}$ inches; there will be a choice between cutting the whole log into these, thereby losing the angular pieces, *a b c d e f g h;* or, cutting the central portion A B C D only into these, reserving the four exterior pieces, A B, B C, C D, and A D, for other purposes. If the former method is adopted, the solid content of the 47 laths will be $11\frac{3}{4}$ feet, the angular pieces, *a b c d e f g h*, which increase in size as they recede from the smaller end, being quite cut up and lost for all useful purposes. The second method is the more economical, as, although there are supposed to be only 35 laths in the present instance, the four exterior pieces, A B, B C, C D, and A D, will do more than make up for the want of the 12 laths.

Central portion alone to be sawn into thick planks.

When boards or planks upwards of 1 inch thick are required from a round log, the most economical plan is to cut the central portion into these, and the two outsides into thinner sizes. Let fig. 33 represent a cross section of a round log, the centre and one side sawn into planks each $1\frac{1}{2}$ inches thick, and the other side into boards each $\frac{1}{2}$ inch thick. It will be perceived that the loss in squaring the edges of the $\frac{1}{2}$-inch boards, each by itself, is almost nominal; while that in squaring the edges of the thicker planks on the opposite side is very considerable. There would be little loss in this operation on the central portion, whether the timber were sawn into the $\frac{1}{2}$-inch or the $1\frac{1}{2}$-inch plank.

Fig. 33.



A saw-miller, carefully and continuously giving his attention to such subjects, may save timber equivalent to three times his wages, as compared with another who neglects them. By taking off the slabs, A B, B C, C D, of fig. 32, or that of A B C, fig. 33, either too large or too small, less or more timber will be lost. If the saw-miller engaged in cutting planking has not the substance of Tables XVIII. and XIX. already in his head, he cannot have them in his hand a minute too soon with the view of getting them there. Once there, he will be able to thrust the saw in at the proper point instinctively, as a player learns to touch the keys of a musical instrument.

TABLE XVIII.

Showing the THICKNESS of LOG required for a given Number of BOARDS or PLANKS, when the Saw cuts out $\frac{3}{32}$ inch at each Draught.

Thickness of board or plank, ..	in. 1	in. $1\frac{1}{8}$	in. $1\frac{1}{4}$	in. $1\frac{3}{8}$	in. $1\frac{1}{2}$	in. $1\frac{5}{8}$	in. $1\frac{3}{4}$	in. $1\frac{7}{8}$	in. 2	in. $2\frac{1}{8}$	in. $2\frac{1}{4}$	in. $2\frac{3}{8}$	in. $2\frac{1}{2}$	in. $2\frac{5}{8}$	in. $2\frac{3}{4}$	in. $2\frac{7}{8}$	in. 3	in. $3\frac{1}{8}$
1 Board requires	in. $1\frac{3}{32}$	in. $1\frac{7}{32}$	in. $1\frac{11}{32}$	in. $1\frac{15}{32}$	in. $1\frac{19}{32}$	in. $1\frac{23}{32}$	in. $1\frac{27}{32}$	in. $1\frac{31}{32}$	in. $2\frac{3}{32}$	in. $2\frac{7}{32}$	in. $2\frac{11}{32}$	in. $2\frac{15}{32}$	in. $2\frac{19}{32}$	in. $2\frac{23}{32}$	in. $2\frac{27}{32}$	in. $2\frac{31}{32}$	in. $3\frac{3}{32}$	in. $3\frac{7}{32}$
2 Boards require	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$	$3\frac{3}{16}$	$3\frac{7}{16}$	$3\frac{11}{16}$	$3\frac{15}{16}$	$4\frac{3}{16}$	$4\frac{7}{16}$	$4\frac{11}{16}$	$4\frac{15}{16}$	$5\frac{3}{16}$	$5\frac{7}{16}$	$5\frac{11}{16}$	$5\frac{15}{16}$	$6\frac{3}{16}$	$6\frac{7}{16}$
3 do. do.	$3\frac{9}{32}$	$3\frac{21}{32}$	$4\frac{1}{32}$	$4\frac{13}{32}$	$4\frac{25}{32}$	$5\frac{5}{32}$	$5\frac{17}{32}$	$5\frac{29}{32}$	$6\frac{9}{32}$	$6\frac{21}{32}$	$7\frac{1}{32}$	$7\frac{13}{32}$	$7\frac{25}{32}$	$8\frac{5}{32}$	$8\frac{17}{32}$	$8\frac{29}{32}$	$9\frac{9}{32}$	$9\frac{21}{32}$
4 do. do.	$4\frac{3}{8}$	$4\frac{7}{8}$	$5\frac{3}{8}$	$5\frac{7}{8}$	$6\frac{3}{8}$	$6\frac{7}{8}$	$7\frac{3}{8}$	$7\frac{7}{8}$	$8\frac{3}{8}$	$8\frac{7}{8}$	$9\frac{3}{8}$	$9\frac{7}{8}$	$10\frac{3}{8}$	$10\frac{7}{8}$	$11\frac{3}{8}$	$11\frac{7}{8}$	$12\frac{3}{8}$	$12\frac{7}{8}$
5 do. do.	$5\frac{15}{32}$	$6\frac{3}{32}$	$6\frac{23}{32}$	$7\frac{11}{32}$	$7\frac{31}{32}$	$8\frac{19}{32}$	$9\frac{7}{32}$	$9\frac{27}{32}$	$10\frac{15}{32}$	$11\frac{3}{32}$	$11\frac{23}{32}$	$12\frac{11}{32}$	$12\frac{31}{32}$	$13\frac{19}{32}$	$14\frac{7}{32}$	$14\frac{27}{32}$	$15\frac{19}{32}$	$16\frac{3}{32}$
6 do. do.	$6\frac{9}{16}$	$7\frac{5}{16}$	$8\frac{1}{16}$	$8\frac{13}{16}$	$9\frac{9}{16}$	$10\frac{5}{16}$	$11\frac{1}{16}$	$11\frac{13}{16}$	$12\frac{9}{16}$	$13\frac{5}{16}$	$14\frac{1}{16}$	$14\frac{13}{16}$	$15\frac{9}{16}$	$16\frac{5}{16}$	$17\frac{1}{16}$	$17\frac{13}{16}$	$18\frac{9}{16}$	$19\frac{5}{16}$
7 do. do.	$7\frac{21}{32}$	$8\frac{17}{32}$	$9\frac{13}{32}$	$10\frac{9}{32}$	$11\frac{5}{32}$	$12\frac{1}{32}$	$12\frac{29}{32}$	$13\frac{25}{32}$	$14\frac{21}{32}$	$15\frac{17}{32}$	$16\frac{13}{32}$	$17\frac{9}{32}$	$18\frac{5}{32}$	$19\frac{1}{32}$	$19\frac{29}{32}$	$20\frac{25}{32}$	..	..
8 do. do.	$8\frac{3}{4}$	$9\frac{3}{4}$	$10\frac{3}{4}$	$11\frac{3}{4}$	$12\frac{3}{4}$	$13\frac{3}{4}$	$14\frac{3}{4}$	$15\frac{3}{4}$	$16\frac{3}{4}$	$17\frac{3}{4}$	$18\frac{3}{4}$	$19\frac{3}{4}$	..	..	..	..	..	..
9 do. do.	$9\frac{27}{32}$	$10\frac{23}{32}$	$12\frac{3}{32}$	$13\frac{7}{32}$	$14\frac{11}{32}$	$15\frac{15}{32}$	$16\frac{19}{32}$	$17\frac{23}{32}$	$18\frac{27}{32}$	$19\frac{31}{32}$	..	..	..	..	..	..	..	..
10 do. do.	$10\frac{15}{16}$	$12\frac{3}{16}$	$13\frac{7}{16}$	$14\frac{11}{16}$	$15\frac{15}{16}$	$17\frac{3}{32}$	$18\frac{7}{16}$	$19\frac{11}{16}$	..	..	..	..	..	..	..	..	..	..
11 do. do.	$12\frac{1}{32}$	$13\frac{13}{32}$	$14\frac{25}{32}$	$16\frac{5}{32}$	$17\frac{17}{32}$	$18\frac{29}{32}$	..	..	..	..	..	..	..	..	..	..	..	..
12 do. do.	$13\frac{1}{8}$	$14\frac{5}{8}$	$16\frac{1}{8}$	$17\frac{5}{8}$	$19\frac{1}{8}$	..	..	..	..	..	..	..	..	..	..	..	..	..
13 do. do.	$14\frac{7}{32}$	$15\frac{27}{32}$	$17\frac{15}{32}$	$19\frac{3}{32}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14 do. do.	$15\frac{5}{16}$	$17\frac{1}{16}$	$18\frac{13}{16}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15 do. do.	$16\frac{13}{32}$	$18\frac{9}{32}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16 do. do.	$17\frac{1}{2}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17 do. do.	$18\frac{29}{32}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

TABLE XIX.

Showing the THICKNESS of LOG required for a given Number of BOARDS or PLANKS, when the Saw cuts out $\frac{5}{32}$ inch at each Draught.

Thickness of board or plank, ..	in. 1	in. $1\frac{1}{8}$	in. $1\frac{1}{4}$	in. $1\frac{3}{8}$	in. $1\frac{1}{2}$	in. $1\frac{5}{8}$	in. $1\frac{3}{4}$	in. $1\frac{7}{8}$	in. 2	in. $2\frac{1}{8}$	in. $2\frac{1}{4}$	in. $2\frac{3}{8}$	in. $2\frac{1}{2}$	in. $2\frac{5}{8}$	in. $2\frac{3}{4}$	in. $2\frac{7}{8}$	in. 3	in. $3\frac{1}{8}$
1 Board requires	in. $1\frac{5}{32}$	in. $1\frac{9}{32}$	in. $1\frac{13}{32}$	in. $1\frac{17}{32}$	in. $1\frac{21}{32}$	in. $1\frac{25}{32}$	in. $1\frac{29}{32}$	in. $2\frac{1}{32}$	in. $2\frac{5}{32}$	in. $2\frac{9}{32}$	in. $2\frac{13}{32}$	in. $2\frac{17}{32}$	in. $2\frac{21}{32}$	in. $2\frac{25}{32}$	in. $2\frac{29}{32}$	in. $3\frac{1}{32}$	in. $3\frac{5}{32}$	in. $3\frac{9}{32}$
2 Boards require	$2\frac{5}{16}$	$2\frac{9}{16}$	$2\frac{13}{16}$	$3\frac{1}{16}$	$3\frac{5}{16}$	$3\frac{9}{16}$	$3\frac{13}{16}$	$4\frac{1}{16}$	$4\frac{5}{16}$	$4\frac{9}{16}$	$4\frac{13}{16}$	$5\frac{1}{16}$	$5\frac{5}{16}$	$5\frac{9}{16}$	$5\frac{13}{16}$	$6\frac{1}{16}$	$6\frac{5}{16}$	$6\frac{9}{16}$
3 do. do.	$3\frac{15}{32}$	$3\frac{27}{32}$	$4\frac{7}{32}$	$4\frac{19}{32}$	$4\frac{31}{32}$	$5\frac{11}{32}$	$5\frac{23}{32}$	$6\frac{3}{32}$	$6\frac{15}{32}$	$6\frac{27}{32}$	$7\frac{7}{32}$	$7\frac{19}{32}$	$7\frac{31}{32}$	$8\frac{11}{32}$	$8\frac{23}{32}$	$9\frac{3}{32}$	$9\frac{15}{32}$	$9\frac{27}{32}$
4 do. do.	$4\frac{5}{8}$	$5\frac{1}{8}$	$5\frac{5}{8}$	$6\frac{1}{8}$	$6\frac{5}{8}$	$7\frac{1}{8}$	$7\frac{5}{8}$	$8\frac{1}{8}$	$8\frac{5}{8}$	$9\frac{1}{8}$	$9\frac{5}{8}$	$10\frac{1}{8}$	$10\frac{5}{8}$	$11\frac{1}{8}$	$11\frac{5}{8}$	$12\frac{1}{8}$	$12\frac{5}{8}$	$13\frac{1}{8}$
5 do. do.	$5\frac{25}{32}$	$6\frac{13}{32}$	$7\frac{1}{32}$	$7\frac{21}{32}$	$8\frac{9}{32}$	$8\frac{29}{32}$	$9\frac{17}{32}$	$10\frac{5}{32}$	$10\frac{25}{32}$	$11\frac{13}{32}$	$12\frac{1}{32}$	$12\frac{21}{32}$	$13\frac{9}{32}$	$13\frac{29}{32}$	$14\frac{17}{32}$	$15\frac{5}{32}$	$15\frac{25}{32}$	$16\frac{13}{32}$
6 do. do.	$6\frac{15}{16}$	$7\frac{11}{16}$	$8\frac{7}{16}$	$9\frac{3}{16}$	$9\frac{15}{16}$	$10\frac{11}{16}$	$11\frac{7}{16}$	$12\frac{3}{16}$	$12\frac{15}{16}$	$13\frac{11}{16}$	$14\frac{7}{16}$	$15\frac{3}{16}$	$15\frac{15}{16}$	$16\frac{11}{16}$	$17\frac{7}{16}$	$18\frac{3}{16}$	$18\frac{15}{16}$	$19\frac{11}{16}$
7 do. do.	$8\frac{3}{32}$	$8\frac{31}{32}$	$9\frac{27}{32}$	$10\frac{23}{32}$	$11\frac{19}{32}$	$12\frac{15}{32}$	$13\frac{11}{32}$	$14\frac{7}{32}$	$15\frac{3}{32}$	$15\frac{31}{32}$	$16\frac{27}{32}$	$17\frac{23}{32}$	$18\frac{19}{32}$	$19\frac{15}{32}$	$20\frac{11}{32}$	..	..	..
8 do. do.	$9\frac{1}{4}$	$10\frac{1}{4}$	$11\frac{1}{4}$	$12\frac{1}{4}$	$13\frac{1}{4}$	$14\frac{1}{4}$	$15\frac{1}{4}$	$16\frac{1}{4}$	$17\frac{1}{4}$	$18\frac{1}{4}$	$19\frac{1}{4}$	$20\frac{1}{4}$	..	..	..	..	..	..
9 do. do.	$10\frac{13}{32}$	$11\frac{17}{32}$	$12\frac{21}{32}$	$13\frac{25}{32}$	$14\frac{29}{32}$	$16\frac{1}{32}$	$17\frac{5}{32}$	$18\frac{9}{32}$	$19\frac{13}{32}$	..	..	..	..	..	.	..	..	..
10 do. do.	$11\frac{9}{16}$	$12\frac{13}{16}$	$14\frac{1}{16}$	$15\frac{5}{16}$	$16\frac{9}{16}$	$17\frac{13}{16}$	$19\frac{1}{16}$	..	..	..	..	..	..	.	.	..	..	..
11 do. do.	$12\frac{23}{32}$	$14\frac{3}{32}$	$15\frac{15}{32}$	$16\frac{27}{32}$	$18\frac{7}{32}$	$19\frac{19}{32}$	..	..	..	..	..	..	..	..	..	..	..	..
12 do. do.	$13\frac{7}{8}$	$15\frac{3}{8}$	$16\frac{7}{8}$	$18\frac{3}{8}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13 do. do.	$15\frac{1}{32}$	$16\frac{21}{32}$	$18\frac{9}{32}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14 do. do.	$16\frac{3}{16}$	$17\frac{15}{16}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15 do. do.	$17\frac{11}{32}$	$19\frac{7}{32}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16 do. do.	$18\frac{1}{2}$	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

CHAPTER VIII.

OF TIMBER SAWN INTO BOARDS OR PLANKS.

TABLE XV. (page 50) showed the solid content of timber lost by the action of saws of various thicknesses in cutting 100 superficial feet. Table XX. shows the solid content of 100 superficial feet, boards or planks, each $\frac{1}{32}$ to 3 inches thick.

TABLE XX.—Showing the Solid Content of 100 Superficial Feet Boards or Planks.

Thickness of board, . .	in. $\frac{1}{32}$	in. $\frac{1}{16}$	in. $\frac{1}{8}$	in. $\frac{1}{4}$	in. $\frac{1}{3}$	in. $\frac{3}{8}$	in. $\frac{1}{2}$	in. $\frac{5}{8}$	in. $\frac{3}{4}$	in. $\frac{7}{8}$	in. 1	in. $1\frac{1}{8}$	in. $1\frac{1}{4}$	in. $1\frac{3}{8}$
Solid content of 100 superficial feet, . .	ft. in. 0 $3\frac{1}{8}$	ft. in. 0 $6\frac{1}{4}$	ft. in. 1 $0\frac{1}{2}$	ft. in. 2 1	ft. in. 2 $9\frac{1}{3}$	ft. in. 3 $1\frac{1}{2}$	ft. in. 4 2	ft. in. 5 $2\frac{1}{2}$	ft. in. 6 3	ft. in. 7 $3\frac{1}{2}$	ft. in. 8 4	ft. in. 9 $4\frac{1}{2}$	ft. in. 10 5	ft. in. 11 $5\frac{1}{2}$

TABLE XX.—*Continued.*

Thickness of board,	in. $1\frac{1}{2}$	in. $1\frac{5}{8}$	in. $1\frac{3}{4}$	in. $1\frac{7}{8}$	in. 2	in. $2\frac{1}{8}$	in. $2\frac{1}{4}$	in. $2\frac{3}{8}$	in. $2\frac{1}{2}$	in. $2\frac{5}{8}$	in. $2\frac{3}{4}$	in. $2\frac{7}{8}$	in. 3
Solid content of 100 super. ft.	ft. in. 12 6	ft. in. 13 $6\frac{1}{2}$	ft. in. 14 7	ft. in. 15 $7\frac{1}{2}$	ft. in. 16 8	ft. in. 17 $8\frac{1}{2}$	ft. in. 18 9	ft. in. 19 $9\frac{1}{2}$	ft. in. 20 10	ft. in. 21 $10\frac{1}{2}$	ft. in. 22 11	ft. in. 23 $11\frac{1}{2}$	ft. in. 25 0

Round timber required for 100-feet boards.

If one wishes to know the solid content of timber which will produce 100 superficial feet boards of a given thickness, these two Tables (XV. and XX.) show what quantity of squared timber it will be, and at same time what quantity of round timber it very probably will be. If the point to be ascertained is, What quantity will produce 100 superficial feet $\frac{1}{2}$-inch boards, by a saw cutting out $\frac{3}{32}$ inch at each draught?—

Look Table XV. (page 50), and under $\frac{3}{32}$ inch there will be observed 0 ft. 9 in. $4\frac{1}{2}$ pts. for saw-draught; and

Look Table XX., and under $\frac{1}{2}$ inch there will be observed 4 ft. 2 in. 0 pts. for board; giving the solid content of rough timber for 100 feet $\frac{1}{2}$-inch boards, 4 ft. 11 in. $4\frac{1}{2}$ pts.

If the saw used takes out $\frac{5}{32}$ inch at each draught, then the loss by it will be 1 ft. 3 in. $7\frac{1}{2}$ pts., to which add the solid content of the 100 superficial feet boards, each $\frac{1}{2}$ inch thick, 4 ft. 2 in. 0 pts.; giving the solid content of rough timber required for 100 feet $\frac{1}{2}$-inch boards, 5 ft. 5 in. $7\frac{1}{2}$ pts.

Extra measure given by Rule I. makes up for loss by slabbing.

In cutting up foreign timber, a percentage requires to be added to the quantities given in these two Tables, on account of the outsides of the logs, which require to be straightened, and their tapering form, as explained in fig. 6, with remarks. In stating the method of measuring round timber, it was explained that the buyer, by Rule I., gets more wood than net measurement; by a rough and ready calculation, about 5 feet in place of 4. If logs thus measured are pretty straight, fair grown, and cut into boards not exceeding an inch thick, and into lengths not exceeding 12 feet, the extra timber makes up for the loss in the operation of slabbing the logs and straightening the edges of the boards. This is proved by Table XXI. (page 68).

REMARKS ON TABLE XXI.

When the trees forming the subject of this Table were cut in the plantation, each of them was numbered, and their numbers will be found in the left-hand column. Each tree was cut into sections not more than 12 feet long; and the respective numbers of these sections are given in the second column. In a set of columns farther to the right, the girths, under the bark, are given; next follows the solid content of round timber, &c. Log No. 1 was pretty straight grown, and No. 2 was so crooked, that when placed on the saw-bench, and resting on the two extremities of the section, the under side, at the middle, stood three inches up from the bench. This fact serves in so far to explain the variety in the produce of the different trees; but it has also to be kept in view, that the smaller the tree the greater the risk of a *more* than proportionately less number and area of boards. The solid content of the round timber forming the subject of Table XXI. is $43\frac{5}{6}$ feet, and the produce in boards $3349\frac{1}{4}$ superficial feet. By

Close approximation of theory and practice.

TABLE XXI.

Showing the Quantity of Round Timber required to produce 100 Superficial Feet Boards.

As cut in the plantation.		ROUND OR UNMANUFACTURED STATE.						IN THE MANUFACTURED STATE.															
		Circumference.				By Rule 1, solid content.		Thickness of boards.	Number of boards in each section, with the respective breadth of each board at the middle, in inches.									Total number of boards.	Superficial measurement of boards in feet.	Solid content of round wood required to produce 100 superficial feet boards.			Mean solid content of round timber required to produce 100 superficial feet boards.		
No. of log.	Section of log.	At 6 feet from base.	At 12 feet from root.	At 18 feet from root.	At 24 feet from root.				No. in.	No. in.	No. in.	No. in.	No. in.	No. in.	No. in.	No. in.	No. in.			ft.	in.	pts.	ft.	in.	pts.
		in.	in.	in.	in.	ft.	in.	in.																	
1	1	34¼	32¾	..	..	6	0⅛	3/3	1-5⅛	1-5¾	1-6⅛	1-7¼	1-7⅞	1-8¼	1-8¾	9-8⅞	..	..	16	129	4	8	0	..	..	..
2	1	34	31	..	..	6	0¼	3/3	1-5½	1-6	1-6½	1-7	1-7½	2-7¾	6-8¾	..	..	..	13	100½	5	11	10	..	..	..
3	1	40	39	..	..	8	4	3/3	1-4⅝	2-7	1-8	1-8¼	2-9	1-10½	2-11	1-11⅝	2-11¼	7-11½	20	199⅜	4	2	2	4	9	0
4	1	39¼	38	..	..	7	11	3/3	1-6¾	1-7	1-7¾	1-8¼	1-8¾	1-9	1-9½	10-10¼	..	..	17	159½	4	11	6			
5	1	30½	28	..	..	4	10	3/3	1-5½	1-6⅜	1-7	1-7⅝	1-8½	7-8⅝	..	..	..	..	12	95⅛	5	0	11			
,,	2	..	28	25½	23	3	4⅔	3/3	2-4½	2-5½	1-6¾	1-7	5-7⅛	..	..	..	..	..	11	69⅜	4	10	7			
6	1	29	28	..	..	4	4½	3/3	1-4½	2-5	1-6	1-7¼	8-8	..	..	..	..	..	13	91¾	4	9	2			
,,	2	..	28	26	24	3	6¼	3/3	1-4½	1-5	1-6	9-7	..	..	..	..	..	..	12	78½	4	5	10			
,,	3	..	..	22	*	2	6¼	3/3	1-4⅛	1-4½	1-5⅛	1-5⅜	4-5¼	..	..	..	..	..	8	40⅛	6	3	4			
7	1	42	38½	..	..	9	2¼	½	1-7	1-7½	1-9	1-9¾	1-10	1-10½	1-11¼	1-11½	1-12	7-12⅛	16	173½	5	3	4	5	6	7
,,	2	..	38½	35	32	6	4½	½	1-6⅝	1-7	1-7½	1-7⅞	1-8¼	8-9¼	..	..	..	..	13	113¼	5	7	6			
8	1	41	38	..	..	8	9	½	1-6	1-7¼	1-8	1-8⅝	1-9	1-9¼	1-10½	9-11⅛	..	..	16	158⅜	5	6	0			
,,	2	..	38	34½	33	6	2⅛	½	1-6¼	1-7	1-7½	1-8½	8-9⅝	..	..	..	..	..	12	108¼	5	8	10			
9	1	35	31½	..	..	6	4½	½	1-6⅛	1-6½	1-7⅜	1-8	1-8¼	1-9½	1-9½	1-10¼	5-10⅜	..	13	117	5	5	4			
,,	2	..	31½	28½	26½	4	2¾	½	1-5	1-5½	1-7	7-7½	..	..	..	..	..	..	10	70	6	0	6			
10	1	41	38	..	..	8	9	5/8	1-7	1-7½	2-8¼	1-10	8-11	..	..	..	..	..	13	129	6	9	4	6	10	4
11	1	37½	35	..	..	7	4	5/8	1-6¼	1-6⅜	1-8	1-8¼	1-9	7-10¼	..	..	..	..	12	110	6	8	0			
12	1	36	34	..	..	6	9	5/8	1-5	1-5⅜	1-6⅝	1-7	8-9¼	..	..	..	..	..	12	98⅜	6	10	4			
13	1	24½	23	..	..	3	1½	5/8	1-4½	1-5½	5-6⅜	..	..	..	..	..	..	..	7	43¾	7	1	8			
,,	2	..	23	21	19	2	3½	5/8	1-3¾	1-4	2-5½	2-5⅜	..	..	..	..	..	..	6	30¼	7	6	11			
14	1	48	44	..	..	12	0	¾	1-6	2-10	1-13	1-13½	7-14¼	..	..	..	..	..	12	152½	7	10	8	7	9	8
,,	2	..	44	40½	38½	8	6½	¾	1-6	1-8	1-8¼	1-9	1-9½	6-11⅝	..	..	..	..	11	110½	7	8	9			
15	1	42	40	..	..	9	2¼	¾	1-4	1-6¾	1-9	1-9⅛	1-10	1-10⅜	1-11	5-12⅛	..	..	12	121	7	7	1			
,,	2	..	40	37	34	7	1½	¾	1-6½	1-7⅛	1-8	1-9	6-9⅞	..	..	..	..	..	10	90	7	11	0			
16	1	32½	30½	..	..	5	6	¾	1-5½	1-5½	2-7⅝	2-9½	1-9⅝	2-9¾	..	..	..	..	9	74	7	5	2			
,,	2	..	30½	28½	27	4	2¾	¾	1-5½	1-6½	5-7⅜	..	..	..	..	..	..	..	7	49	8	7	6			
17	1	40	36¾	..	..	8	4	7/8	1-7½	1-8½	1-9½	1-10	5-11	..	..	..	..	..	9	90¼	9	2	9	9	2	10
,,	2	..	36¾	33½	32	5	10	7/8	1-6¼	1-6½	1-8	1-8¼	2-8½	2-8¾	..	..	..	..	8	63½	9	2	3			
,,	3	..	..	26	*	3	6¼	7/8	1-5½	5-6	..	..	..	..	..	..	..	..	6	35½	9	11	0			
18	1	37	36	..	..	7	1½	7/8	1-7	1-7½	1-9½	1-10	5-10½	..	..	..	..	..	9	86½	8	2	10			
,,	2	..	36	33	30½	5	8	7/8	2-6	2-8	4-8½	..	..	..	..	..	..	..	8	62	9	1	8			
19	1	29½	27	..	..	4	6⅓	7/8	1-5	1-5½	1-7	4-8	..	..	..	..	..	..	7	49½	9	1	9			
,,	2	..	27	25	23	3	3	7/8	1-5	1-6	3-6⅞	..	..	..	..	..	..	..	5	31⅝	10	3	3			
20	1	26½	23½	..	..	3	7⅝	7/8	2-4½	2-6½	2-7	..	..	..	..	..	..	..	6	36	10	1	9			
,,	2	..	23½	21½	19½	2	4⅝	7/8	1-4	4-5¼	..	..	..	..	..	..	..	..	5	25	9	7	4			
21	1	42	38½	..	..	9	2¼	1/1	2-6	1-8½	1-9½	1-10½	5-11½	..	..	..	..	..	10	98	9	4	6	9	7	7
,,	2	..	38½	37	33	7	1½	1/1	2-7½	1-9½	4-10½	..	..	..	..	..	..	..	7	66½	10	8	6			
22	1	36	33½	..	..	6	9	1/1	1-4⅜	1-6½	1-8⅜	1-9½	4-10½	..	..	..	..	..	8	70¾	9	6	6			
,,	2	..	33½	30½	29	4	10	1/1	1-5½	1-6	2-8	3-8⅜	..	..	..	..	..	..	7	52½	9	2	6			
23	1	36	34	..	..	6	9	1/1	1-6	1-6½	1-8½	1-9	1-10	3-10½	..	..	..	..	8	71½	9	5	3			
,,	2	..	34	32	..	2	10	1/1	1-6	1-7	1-9	4-9¼	..	..	..	..	..	..	7	29½	9	7	3			

* The girths of these two sections are given at 30 feet from the tree-root. *Note.*—Log 23, sec. 2, was only 6 feet long, being found unsuitable for the purpose farther up. Each of the other logs was 12 feet long, and the quarter-girt taken in the middle.

N.B.—The circular saw used in cutting up these trees cut out a draught ⅛ inch thick each time, and each board was allowed 1/16 inch additional thickness, so that the loss by the saw-draught and the additional thickness amounted to 3/16 inch each board.

Tables XV. and XX. the solid content required should have been $43\frac{3}{4}$ feet, a difference of only $\frac{1}{12}$ cubic foot. (Logs 1 and 2 not included.) Where sawing is carefully managed, and the thicker boards and planks taken from the central part of the log, as recommended at fig. 33, the quantities set down in Tables XV. and XX. will be found sufficient for the required purpose. If parallel-edged boards are required, the log must be girthed at the smaller end.

The quantity of slabbing per cubic foot round timber is shown by means of Table XIII.; and the number of cubic feet round timber required to produce 100 superficial feet of boards is shown by Tables XV. and XX., corroborated by Table XXI. Table XXII. shows the number of feet slabbing for 100 superficial feet boards.

REMARKS ON TABLE XXII. (PAGE 70).

This Table is calculated on the supposition that the loss by the saw-draught, with additional thickness given to each board, amount to $\frac{3}{16}$ inch. If 100 superficial feet boards, each $\frac{3}{8}$ inch thick, are to be sawn from a round log, the side of the square (quarter of the circumference) of which is 4 inches, then there are $42\frac{3}{16}$ feet slabbing before these can be obtained, or $142\frac{3}{16}$ feet sawing for 100 feet boards. If the side of the square is 12 inches, then there are only $14\frac{1}{16}$ feet slabbing, or $114\frac{1}{16}$ feet sawing for 100 feet boards. Were 100 superficial feet 3-inch plank required from logs, the mean average side of which is 6 inches, then there would be $159\frac{3}{8}$ feet slabbing, or $259\frac{3}{8}$ feet sawing for these 100 feet 3-inch plank.

Small trees expensive to manufacture.

TABLE

TABLE XXII.

Showing the Number of Superficial Feet SLABBING in 100 Superficial Feet BOARDS when the Saw-draught, or Saw-draught with Additional Thickness given to each Board, is $\frac{3}{16}$ inch.

Thickness of each board.	Rough wood required.		SIDE OF SQUARE OF LOG BEING—								
			4 inch.	5 inch.	6 inch.	7 inch.	8 inch.	9 inch.	10 in.	11 in.	12 in.
inch.	feet.	inch.	feet.	feet.	feet.	feet.	feet.	feet.	feet.	feet.	feet.
$\frac{3}{8}$	4	$8\frac{1}{4}$	$42\frac{3}{16}$	$33\frac{3}{4}$	$28\frac{1}{8}$	24·1074	$21\frac{3}{32}$	$18\frac{9}{12}$	$16\frac{7}{8}$	$15\frac{15}{44}$	$14\frac{1}{16}$
$\frac{1}{2}$	5	$8\frac{3}{4}$	$51\frac{9}{16}$	$41\frac{1}{4}$	$34\frac{3}{8}$	29·4646	$25\frac{25}{32}$	$22\frac{11}{12}$	$20\frac{5}{8}$	$18\frac{33}{44}$	$17\frac{3}{16}$
$\frac{5}{8}$	6	$9\frac{1}{4}$	$60\frac{15}{16}$	$48\frac{3}{4}$	$40\frac{5}{8}$	34·8218	$30\frac{15}{32}$	$27\frac{1}{12}$	$24\frac{3}{8}$	$22\frac{7}{44}$	$20\frac{5}{16}$
$\frac{3}{4}$	7	$9\frac{3}{4}$	$70\frac{5}{16}$	$56\frac{1}{4}$	$46\frac{7}{8}$	40·1790	$35\frac{5}{32}$	$31\frac{3}{12}$	$28\frac{1}{8}$	$25\frac{25}{44}$	$23\frac{7}{16}$
$\frac{7}{8}$	8	$10\frac{1}{4}$	$79\frac{11}{16}$	$63\frac{3}{4}$	$53\frac{1}{8}$	45·5362	$39\frac{27}{32}$	$35\frac{5}{12}$	$31\frac{7}{8}$	$28\frac{43}{44}$	$26\frac{9}{16}$
1	9	$10\frac{3}{4}$	$89\frac{1}{16}$	$71\frac{1}{4}$	$59\frac{3}{8}$	50·8934	$44\frac{17}{32}$	$39\frac{7}{12}$	$35\frac{5}{8}$	$32\frac{17}{44}$	$29\frac{11}{16}$
$1\frac{1}{8}$	10	$11\frac{1}{4}$	$98\frac{7}{16}$	$78\frac{3}{4}$	$65\frac{5}{8}$	56·2506	$49\frac{7}{32}$	$43\frac{9}{12}$	$39\frac{3}{8}$	$35\frac{35}{44}$	$32\frac{13}{16}$
$1\frac{1}{4}$	11	$11\frac{3}{4}$	$107\frac{13}{16}$	$86\frac{1}{4}$	$71\frac{7}{8}$	61·6078	$53\frac{29}{32}$	$47\frac{11}{12}$	$43\frac{1}{8}$	$39\frac{9}{44}$	$35\frac{15}{16}$
$1\frac{3}{8}$	13	$0\frac{1}{4}$	$117\frac{3}{16}$	$93\frac{3}{4}$	$78\frac{1}{8}$	66·9650	$58\frac{19}{32}$	$52\frac{1}{12}$	$46\frac{7}{8}$	$42\frac{27}{44}$	$39\frac{1}{16}$
$1\frac{1}{2}$	14	$0\frac{3}{4}$	$126\frac{9}{16}$	$101\frac{1}{4}$	$84\frac{3}{8}$	72·3222	$63\frac{9}{32}$	$56\frac{3}{12}$	$50\frac{5}{8}$	$46\frac{1}{44}$	$42\frac{3}{16}$
$1\frac{5}{8}$	15	$1\frac{1}{4}$	$135\frac{15}{16}$	$108\frac{3}{4}$	$90\frac{5}{8}$	77·6794	$67\frac{31}{32}$	$60\frac{5}{12}$	$54\frac{3}{8}$	$49\frac{19}{44}$	$45\frac{5}{16}$
$1\frac{3}{4}$	16	$1\frac{3}{4}$	$145\frac{5}{16}$	$116\frac{1}{4}$	$96\frac{7}{8}$	83·0366	$72\frac{21}{32}$	$64\frac{7}{12}$	$58\frac{1}{8}$	$52\frac{37}{44}$	$48\frac{7}{16}$
$1\frac{7}{8}$	17	$2\frac{1}{4}$	$154\frac{1}{16}$	$123\frac{3}{4}$	$103\frac{1}{8}$	88·3938	$77\frac{11}{32}$	$68\frac{9}{12}$	$61\frac{7}{8}$	$56\frac{11}{44}$	$51\frac{9}{16}$
2	18	$2\frac{3}{4}$	$164\frac{1}{16}$	$131\frac{1}{4}$	$109\frac{3}{8}$	93·7510	$82\frac{1}{32}$	$72\frac{11}{12}$	$65\frac{5}{8}$	$59\frac{29}{44}$	$54\frac{11}{16}$
$2\frac{1}{8}$	19	$3\frac{1}{4}$	$173\frac{7}{16}$	$138\frac{3}{4}$	$115\frac{5}{8}$	99·1082	$86\frac{23}{32}$	$77\frac{1}{12}$	$69\frac{3}{8}$	$63\frac{3}{44}$	$57\frac{13}{16}$
$2\frac{1}{4}$	20	$3\frac{3}{4}$	$182\frac{13}{16}$	$146\frac{1}{4}$	$121\frac{7}{8}$	104·4654	$91\frac{3}{32}$	$81\frac{3}{12}$	$73\frac{1}{8}$	$66\frac{21}{44}$	$60\frac{15}{16}$
$2\frac{3}{8}$	21	$4\frac{1}{4}$	$192\frac{3}{16}$	$153\frac{3}{4}$	$128\frac{1}{8}$	109·8226	$96\frac{3}{32}$	$85\frac{5}{12}$	$76\frac{7}{8}$	$69\frac{39}{44}$	$64\frac{1}{16}$
$2\frac{1}{2}$	22	$4\frac{3}{4}$	$201\frac{9}{16}$	$161\frac{1}{4}$	$134\frac{3}{8}$	115·1798	$100\frac{25}{32}$	$89\frac{7}{12}$	$80\frac{5}{8}$	$73\frac{13}{44}$	$67\frac{3}{16}$
$2\frac{5}{8}$	23	$5\frac{1}{4}$	$210\frac{15}{16}$	$168\frac{3}{4}$	$140\frac{5}{8}$	120·5370	$105\frac{15}{32}$	$93\frac{9}{12}$	$84\frac{3}{8}$	$76\frac{31}{44}$	$70\frac{5}{16}$
$2\frac{3}{4}$	24	$5\frac{3}{4}$	$220\frac{5}{16}$	$176\frac{1}{4}$	$146\frac{7}{8}$	125·8942	$110\frac{5}{32}$	$97\frac{11}{12}$	$88\frac{1}{8}$	$80\frac{5}{44}$	$73\frac{7}{16}$
$2\frac{7}{8}$	25	$6\frac{1}{4}$	$229\frac{11}{16}$	$183\frac{3}{4}$	$153\frac{1}{8}$	131·2514	$114\frac{27}{32}$	$102\frac{1}{12}$	$91\frac{7}{8}$	$83\frac{23}{44}$	$76\frac{9}{16}$
3	26	$6\frac{3}{4}$	$239\frac{1}{16}$	$191\frac{1}{4}$	$159\frac{3}{8}$	136·6086	$119\frac{7}{32}$	$106\frac{3}{12}$	$95\frac{5}{8}$	$86\frac{41}{44}$	$79\frac{11}{16}$

TABLE XXIII.

Showing the VALUE of 100 SUPERFICIAL FEET BOARDS.

Thickness of board.	Net solid content.			$\frac{1}{16}$ inch lost in sawing.*			Gross solid content.			When the buying price of the rough timber, loss in manufacture, and expenses, amount per cubic foot to												
										6-pence.	7-pence.	8-pence.	9-pence.	10-pence.	11-pence.	12-pence.	13-pence.	14-pence.	15-pence.	16-pence.	17-pence.	18-pence.	19-pence.	20-pence.
inches.	ft.	in.	pts	ft.	in.	pts	ft.	in.	pts															
$\frac{3}{8}$	3	1	6	0	6	3	3	7	9	1/9$\frac{3}{4}$	2/1$\frac{1}{2}$	2/5	2/8$\frac{3}{4}$	3/0$\frac{1}{4}$	3/4	3/7$\frac{3}{4}$	3/11$\frac{1}{4}$	4/3	4/6$\frac{1}{2}$	4/10$\frac{1}{4}$	5/1$\frac{3}{4}$	5/5$\frac{1}{2}$	5/9$\frac{1}{4}$	6/0$\frac{3}{4}$
$\frac{1}{2}$	4	2	0	0	6	3	4	8	3	2/4	2/8$\frac{3}{4}$	3/1$\frac{1}{2}$	3/6	3/10$\frac{3}{4}$	4/3$\frac{1}{2}$	4/8$\frac{1}{4}$	5/0$\frac{3}{4}$	5/5$\frac{1}{2}$	5/10$\frac{1}{4}$	6/3	6/7$\frac{1}{2}$	7/0$\frac{1}{4}$	7/5	7/9$\frac{3}{4}$
$\frac{5}{8}$	5	2	6	0	6	3	5	8	9	2/10$\frac{1}{4}$	3/4	3/9$\frac{3}{4}$	4/3$\frac{1}{2}$	4/9$\frac{1}{4}$	5/3	5/8$\frac{3}{4}$	6/2$\frac{1}{4}$	6/8	7/1$\frac{3}{4}$	7/7$\frac{1}{2}$	8/1$\frac{1}{4}$	8/7	9/0$\frac{3}{4}$	9/6$\frac{1}{2}$
$\frac{3}{4}$	6	3	0	0	6	3	6	9	3	3/4$\frac{1}{2}$	3/11$\frac{1}{4}$	4/6	5/0$\frac{3}{4}$	5/7$\frac{1}{2}$	6/2$\frac{1}{4}$	6/9$\frac{1}{4}$	7/4	7/10$\frac{3}{4}$	8/5$\frac{1}{2}$	9/0$\frac{1}{4}$	9/7	10/1$\frac{3}{4}$	10/8$\frac{1}{2}$	11/3$\frac{1}{4}$
$\frac{7}{8}$	7	3	6	0	6	3	7	9	9	3/10$\frac{3}{4}$	4/6$\frac{1}{2}$	5/2$\frac{1}{2}$	5/10$\frac{1}{4}$	6/6	7/1$\frac{3}{4}$	7/9$\frac{3}{4}$	8/5$\frac{1}{2}$	9/1$\frac{1}{4}$	9/9	10/5	11/0$\frac{3}{4}$	11/8$\frac{1}{2}$	12/4$\frac{1}{4}$	13/0$\frac{1}{4}$
1	8	4	0	0	6	3	8	10	3	4/5	5/1$\frac{3}{4}$	5/10$\frac{3}{4}$	6/7$\frac{1}{2}$	7/4$\frac{1}{2}$	8/1$\frac{1}{4}$	8/10$\frac{1}{4}$	9/7	10/3$\frac{3}{4}$	11/0$\frac{3}{4}$	11/9$\frac{1}{2}$	12/6$\frac{1}{2}$	13/3$\frac{1}{4}$	14/	14/9
1$\frac{1}{8}$	9	4	6	0	6	3	9	10	9	4/11$\frac{1}{4}$	5/9$\frac{1}{4}$	6/7	7/5	8/2$\frac{3}{4}$	9/0$\frac{3}{4}$	9/10$\frac{3}{4}$	10/8$\frac{1}{2}$	11/6$\frac{1}{2}$	12/4$\frac{1}{4}$	13/2$\frac{1}{4}$	14/	14/10	15/8	16/5$\frac{3}{4}$
1$\frac{1}{4}$	10	5	0	0	6	3	10	11	3	5/5$\frac{1}{2}$	6/4$\frac{1}{2}$	7/3$\frac{1}{2}$	8/2$\frac{1}{4}$	9/1$\frac{1}{4}$	10/0$\frac{1}{4}$	10/11$\frac{1}{4}$	11/10	12/9	13/8	14/7	15/5$\frac{3}{4}$	16/4$\frac{3}{4}$	17/3$\frac{3}{4}$	18/2$\frac{3}{4}$
1$\frac{3}{8}$	11	5	6	0	6	3	11	11	9	5/11$\frac{3}{4}$	6/11$\frac{3}{4}$	7/11$\frac{3}{4}$	8/11$\frac{3}{4}$	9/11$\frac{3}{4}$	10/11$\frac{3}{4}$	11/11$\frac{3}{4}$	12/11$\frac{1}{2}$	13/11$\frac{1}{2}$	14/11$\frac{1}{2}$	15/11$\frac{1}{2}$	16/11$\frac{1}{2}$	17/11$\frac{1}{2}$	18/11$\frac{1}{2}$	19/11$\frac{1}{2}$
1$\frac{1}{2}$	12	6	0	0	6	3	13	0	3	6/6	7/7	8/8	9/9	10/10	11/11	13/0$\frac{1}{4}$	14/1$\frac{1}{4}$	15/2$\frac{1}{4}$	16/3$\frac{1}{4}$	17/4$\frac{1}{4}$	18/5$\frac{1}{4}$	19/6$\frac{1}{4}$	20/7$\frac{1}{4}$	21/8$\frac{1}{4}$
1$\frac{5}{8}$	13	6	6	0	6	3	14	0	9	7/0$\frac{1}{4}$	8/2$\frac{1}{4}$	9/4$\frac{1}{2}$	10/6$\frac{1}{2}$	11/8$\frac{1}{2}$	12/10$\frac{1}{2}$	14/0$\frac{3}{4}$	15/2$\frac{3}{4}$	16/4$\frac{3}{4}$	17/6$\frac{3}{4}$	18/9	19/11	21/1	22/3	23/5$\frac{1}{4}$
1$\frac{3}{4}$	14	7	0	0	6	3	15	1	3	7/6$\frac{1}{2}$	8/9$\frac{1}{2}$	10/0$\frac{3}{4}$	11/3$\frac{3}{4}$	12/7	13/10	15/1$\frac{1}{4}$	16/4$\frac{1}{4}$	17/7$\frac{1}{4}$	18/10$\frac{1}{2}$	20/1$\frac{1}{2}$	21/4$\frac{3}{4}$	22/7$\frac{3}{4}$	23/10$\frac{3}{4}$	25/2
1$\frac{7}{8}$	15	7	6	0	6	3	16	1	9	8/0$\frac{3}{4}$	9/5	10/9	12/1$\frac{1}{4}$	13/5$\frac{1}{4}$	14/9$\frac{1}{2}$	16/1$\frac{3}{4}$	17/5$\frac{3}{4}$	18/10	20/2	21/6$\frac{1}{4}$	22/10$\frac{1}{4}$	24/2$\frac{1}{2}$	25/6$\frac{3}{4}$	26/10$\frac{3}{4}$
2	16	8	0	0	6	3	17	2	3	8/7	10/0$\frac{1}{4}$	11/5$\frac{1}{2}$	12/10$\frac{1}{2}$	14/3$\frac{3}{4}$	15/9	17/2$\frac{1}{4}$	18/7$\frac{1}{4}$	20/0$\frac{1}{2}$	21/5$\frac{3}{4}$	22/11	24/4	25/9$\frac{1}{4}$	27/2$\frac{1}{2}$	28/7$\frac{3}{4}$
2$\frac{1}{8}$	17	8	6	0	6	3	18	2	9	9/1$\frac{1}{4}$	10/7$\frac{1}{2}$	12/1$\frac{3}{4}$	13/8	15/2$\frac{1}{4}$	16/8$\frac{1}{2}$	18/2$\frac{3}{4}$	19/8$\frac{3}{4}$	21/3	22/9$\frac{1}{4}$	24/3$\frac{1}{2}$	25/9$\frac{3}{4}$	27/4	28/10$\frac{1}{4}$	30/4$\frac{1}{2}$
2$\frac{1}{4}$	18	9	0	0	6	3	19	3	3	9/7$\frac{1}{2}$	11/2$\frac{3}{4}$	12/10	14/5$\frac{1}{4}$	16/0$\frac{1}{2}$	17/7$\frac{3}{4}$	19/3$\frac{1}{4}$	20/10$\frac{1}{2}$	22/5$\frac{3}{4}$	24/1	25/8$\frac{1}{4}$	27/3$\frac{1}{2}$	28/10$\frac{3}{4}$	30/6	32/1$\frac{1}{4}$
2$\frac{3}{8}$	19	9	6	0	6	3	20	3	9	10/1$\frac{3}{4}$	11/10	13/6$\frac{1}{2}$	15/2$\frac{3}{4}$	16/11	18/7$\frac{1}{4}$	20/3$\frac{3}{4}$	22/	23/8$\frac{1}{4}$	25/4$\frac{1}{2}$	27/1	28/9$\frac{1}{4}$	30/5$\frac{1}{2}$	32/1$\frac{3}{4}$	33/10$\frac{1}{4}$
2$\frac{1}{2}$	20	10	0	0	6	3	21	4	3	10/8	12/5$\frac{1}{4}$	14/2$\frac{3}{4}$	16/	17/9$\frac{1}{2}$	19/6$\frac{3}{4}$	21/4$\frac{1}{4}$	23/1$\frac{1}{2}$	24/10$\frac{3}{4}$	26/8$\frac{1}{4}$	28/5$\frac{1}{2}$	30/3	32/0$\frac{1}{4}$	33/9$\frac{1}{2}$	35/7
2$\frac{5}{8}$	21	10	6	0	6	3	22	4	9	11/2$\frac{1}{4}$	13/0$\frac{3}{4}$	14/11	16/9$\frac{1}{2}$	18/7$\frac{3}{4}$	20/6$\frac{1}{4}$	22/4$\frac{3}{4}$	24/3	26/1$\frac{1}{2}$	27/11$\frac{3}{4}$	29/10$\frac{1}{4}$	31/8$\frac{1}{2}$	33/7	35/5$\frac{1}{2}$	37/3$\frac{3}{4}$
2$\frac{3}{4}$	22	11	0	0	6	3	23	5	3	11/8$\frac{1}{2}$	13/8	15/7$\frac{1}{2}$	17/6$\frac{3}{4}$	19/6$\frac{1}{4}$	21/5$\frac{3}{4}$	23/5$\frac{1}{4}$	25/4$\frac{1}{2}$	27/4	29/3$\frac{1}{2}$	31/3	33/2$\frac{1}{4}$	35/1$\frac{3}{4}$	37/1$\frac{1}{4}$	39/0$\frac{3}{4}$
2$\frac{7}{8}$	23	11	6	0	6	3	24	5	9	12/2$\frac{3}{4}$	14/3$\frac{1}{4}$	16/3$\frac{3}{4}$	18/4$\frac{1}{4}$	20/4$\frac{3}{4}$	22/5$\frac{1}{4}$	24/5$\frac{3}{4}$	26/6	28/6$\frac{1}{2}$	30/7	32/7$\frac{1}{2}$	34/8	36/8$\frac{1}{2}$	38/8$\frac{3}{4}$	40/9$\frac{1}{4}$
3	25	0	0	0	6	3	25	6	3	12/9	14/10$\frac{1}{2}$	17/	19/1$\frac{1}{2}$	21/3	23/4$\frac{1}{2}$	25/6$\frac{1}{4}$	27/7$\frac{3}{4}$	29/9$\frac{1}{4}$	31/10$\frac{3}{4}$	34/0$\frac{1}{4}$	36/1$\frac{3}{4}$	38/3$\frac{1}{4}$	40/4$\frac{3}{4}$	42/6$\frac{1}{4}$

* *i.e.* When each saw-draught is $\frac{1}{16}$ inch thick; or when the saw-draught, with additional thickness given to each board, amounts to $\frac{1}{16}$ inch thick.

TABLE XXIV.

Showing the Value of 100 Superficial Feet Boards.

Thickness of board.	Net solid content.			$\frac{3}{32}$ inch lost in sawing.*			Gross solid content.			When the buying price of the rough timber, loss in manufacture, and expenses, amount per cubic foot to												
										6-pence.	7-pence.	8-pence.	9-pence.	10-pence.	11-pence.	12-pence.	13-pence.	14-pence.	15-pence.	16-pence.	17-pence.	18-pence.	19-pence.	20-pence.
inches.	ft.	in.	pts	ft.	in.	pts	ft.	in.	pts.															
$\frac{3}{8}$	3	1	6	0	9	$4\frac{1}{2}$	3	10	$10\frac{1}{2}$	1/11$\frac{1}{4}$	2/3$\frac{1}{4}$	2/7$\frac{1}{4}$	2/11	3/3	3/6$\frac{3}{4}$	3/10$\frac{3}{4}$	4/2$\frac{3}{4}$	4/6$\frac{1}{2}$	4/10$\frac{1}{2}$	5/2$\frac{1}{2}$	5/6$\frac{1}{4}$	5/10$\frac{1}{4}$	6/2	6/6
$\frac{1}{2}$	4	2	0	0	9	$4\frac{1}{2}$	4	11	$4\frac{1}{2}$	2/5$\frac{1}{2}$	2/10$\frac{1}{2}$	3/3$\frac{1}{2}$	3/8$\frac{1}{2}$	4/1$\frac{1}{4}$	4/6$\frac{1}{4}$	4/11$\frac{1}{4}$	5/4$\frac{1}{4}$	5/9$\frac{1}{4}$	6/2	6/7	7/	7/5	7/10	8/2$\frac{3}{4}$
$\frac{5}{8}$	5	2	6	0	9	$4\frac{1}{2}$	5	11	$10\frac{1}{2}$	2/11$\frac{3}{4}$	3/5$\frac{3}{4}$	3/11$\frac{3}{4}$	4/5$\frac{3}{4}$	4/11$\frac{3}{4}$	5/5$\frac{3}{4}$	5/11$\frac{3}{4}$	6/5$\frac{3}{4}$	6/11$\frac{3}{4}$	7/5$\frac{3}{4}$	7/11$\frac{3}{4}$	8/5$\frac{3}{4}$	8/11$\frac{3}{4}$	9/5$\frac{3}{4}$	9/11$\frac{3}{4}$
$\frac{3}{4}$	6	3	0	0	9	$4\frac{1}{2}$	7	0	$4\frac{1}{2}$	3/6	4/1	4/8$\frac{1}{4}$	5/3$\frac{1}{4}$	5/10$\frac{1}{4}$	6/5$\frac{1}{4}$	7/0$\frac{1}{4}$	7/7$\frac{1}{4}$	8/2$\frac{1}{4}$	8/9$\frac{1}{4}$	9/4$\frac{1}{2}$	9/11$\frac{1}{2}$	10/6$\frac{1}{2}$	11/1$\frac{1}{2}$	11/8$\frac{1}{2}$
$\frac{7}{8}$	7	3	6	0	9	$4\frac{1}{2}$	8	0	$10\frac{1}{2}$	4/0$\frac{1}{4}$	4/8$\frac{1}{2}$	5/4$\frac{1}{2}$	6/0$\frac{1}{2}$	6/8$\frac{1}{2}$	7/4$\frac{3}{4}$	8/0$\frac{3}{4}$	8/8$\frac{3}{4}$	9/5	10/1	10/9	11/5	12/1$\frac{1}{4}$	12/9$\frac{1}{4}$	13/5$\frac{1}{4}$
1	8	4	0	0	9	$4\frac{1}{2}$	9	1	$4\frac{1}{2}$	4/6$\frac{1}{2}$	5/3$\frac{3}{4}$	6/0$\frac{3}{4}$	6/10	7/7	8/4$\frac{1}{4}$	9/1$\frac{1}{4}$	9/10$\frac{1}{4}$	10/7$\frac{1}{2}$	11/4$\frac{1}{2}$	12/1$\frac{3}{4}$	12/10$\frac{3}{4}$	13/8	14/5	15/2$\frac{1}{4}$
1$\frac{1}{8}$	9	4	6	0	9	$4\frac{1}{2}$	10	1	$10\frac{1}{2}$	5/0$\frac{3}{4}$	5/11	6/9$\frac{1}{4}$	7/7$\frac{1}{4}$	8/5$\frac{1}{2}$	9/3$\frac{1}{2}$	10/1$\frac{3}{4}$	11/	11/10	12/8$\frac{1}{4}$	13/6$\frac{1}{2}$	14/4$\frac{1}{2}$	15/2$\frac{3}{4}$	16/0$\frac{3}{4}$	16/11
1$\frac{1}{4}$	10	5	0	0	9	$4\frac{1}{2}$	11	2	$4\frac{1}{2}$	5/7	6/6$\frac{1}{4}$	7/5$\frac{1}{2}$	8/4$\frac{3}{4}$	9/3$\frac{3}{4}$	10/3	11/2$\frac{1}{4}$	12/1$\frac{1}{2}$	13/0$\frac{3}{4}$	13/11$\frac{3}{4}$	14/11	15/10$\frac{1}{4}$	16/9$\frac{1}{2}$	17/8$\frac{3}{4}$	18/7$\frac{3}{4}$
1$\frac{3}{8}$	11	5	6	0	9	$4\frac{1}{2}$	12	2	$10\frac{1}{2}$	6/1$\frac{1}{4}$	7/1$\frac{1}{2}$	8/1$\frac{3}{4}$	9/2	10/2$\frac{1}{4}$	11/2$\frac{1}{2}$	12/2$\frac{3}{4}$	13/3	14/3$\frac{1}{4}$	15/3$\frac{1}{2}$	16/3$\frac{3}{4}$	17/4	18/4$\frac{1}{4}$	19/4$\frac{1}{2}$	20/4$\frac{3}{4}$
1$\frac{1}{2}$	12	6	0	0	9	$4\frac{1}{2}$	13	3	$4\frac{1}{2}$	6/7$\frac{1}{2}$	7/8$\frac{3}{4}$	8/10$\frac{1}{4}$	9/11$\frac{1}{2}$	11/0$\frac{3}{4}$	12/2	13/3$\frac{1}{4}$	14/4$\frac{1}{2}$	15/5$\frac{3}{4}$	16/7	17/8$\frac{1}{2}$	18/9$\frac{3}{4}$	19/11	21/0$\frac{1}{4}$	22/1$\frac{1}{2}$
1$\frac{5}{8}$	13	6	6	0	9	$4\frac{1}{2}$	14	3	$10\frac{1}{2}$	7/1$\frac{3}{4}$	8/4$\frac{1}{4}$	9/6$\frac{1}{2}$	10/8$\frac{3}{4}$	11/11	13/1$\frac{1}{2}$	14/3$\frac{3}{4}$	15/6	16/8$\frac{1}{2}$	17/10$\frac{3}{4}$	19/1	20/3$\frac{1}{4}$	21/5$\frac{3}{4}$	22/8	23/10$\frac{1}{4}$
1$\frac{3}{4}$	14	7	0	0	9	$4\frac{1}{2}$	15	4	$4\frac{1}{2}$	7/8	8/11$\frac{1}{2}$	10/2$\frac{3}{4}$	11/6$\frac{1}{4}$	12/9$\frac{1}{2}$	14/1	15/4$\frac{1}{4}$	16/7$\frac{1}{2}$	17/11	19/2$\frac{1}{4}$	20/5$\frac{3}{4}$	21/9	23/0$\frac{1}{2}$	24/3$\frac{3}{4}$	25/7$\frac{1}{4}$
1$\frac{7}{8}$	15	7	6	0	9	$4\frac{1}{2}$	16	4	$10\frac{1}{2}$	8/2$\frac{1}{4}$	9/6$\frac{3}{4}$	10/11$\frac{1}{4}$	12/3$\frac{1}{2}$	13/8	15/0$\frac{1}{4}$	16/4$\frac{3}{4}$	17/9$\frac{1}{4}$	19/1$\frac{1}{2}$	20/6	21/10$\frac{1}{2}$	23/2$\frac{3}{4}$	24/7$\frac{1}{4}$	25/11$\frac{1}{2}$	27/4
2	16	8	0	0	9	$4\frac{1}{2}$	17	5	$4\frac{1}{2}$	8/8$\frac{1}{2}$	10/2	11/7$\frac{1}{2}$	13/1	14/6$\frac{1}{4}$	15/11$\frac{3}{4}$	17/5$\frac{1}{4}$	18/10$\frac{3}{4}$	20/4$\frac{1}{2}$	21/9$\frac{1}{2}$	23/3	24/8$\frac{1}{2}$	26/2	27/7$\frac{1}{2}$	29/0$\frac{3}{4}$
2$\frac{1}{8}$	17	8	6	0	9	$4\frac{1}{2}$	18	5	$10\frac{1}{2}$	9/2$\frac{3}{4}$	10/9$\frac{1}{4}$	12/3$\frac{3}{4}$	13/10$\frac{1}{4}$	15/4$\frac{3}{4}$	16/11$\frac{1}{4}$	18/5$\frac{3}{4}$	20/0$\frac{1}{4}$	21/6$\frac{3}{4}$	23/1$\frac{1}{4}$	24/7$\frac{3}{4}$	26/2$\frac{1}{4}$	27/8$\frac{3}{4}$	29/3$\frac{1}{4}$	30/9$\frac{3}{4}$
2$\frac{1}{4}$	18	9	0	0	9	$4\frac{1}{2}$	19	6	$4\frac{1}{2}$	9/9	11/4$\frac{1}{2}$	13/0$\frac{1}{4}$	14/7$\frac{3}{4}$	16/3$\frac{1}{4}$	17/10$\frac{3}{4}$	19/6$\frac{1}{4}$	21/1$\frac{3}{4}$	22/9$\frac{1}{4}$	24/4$\frac{3}{4}$	26/0$\frac{1}{2}$	27/8	29/3$\frac{1}{2}$	30/11	32/6$\frac{1}{2}$
2$\frac{3}{8}$	19	9	6	0	9	$4\frac{1}{2}$	20	6	$10\frac{1}{2}$	10/3$\frac{1}{4}$	12/0	13/8$\frac{1}{2}$	15/5	17/1$\frac{1}{2}$	18/10$\frac{1}{4}$	20/6$\frac{3}{4}$	22/3$\frac{1}{4}$	24/	25/8$\frac{1}{2}$	27/5	29/1$\frac{1}{2}$	30/10$\frac{1}{4}$	32/6$\frac{3}{4}$	34/3$\frac{1}{4}$
2$\frac{1}{2}$	20	10	0	0	9	$4\frac{1}{2}$	21	7	$4\frac{1}{2}$	10/9$\frac{1}{2}$	12/7$\frac{1}{4}$	14/4$\frac{3}{4}$	16/2$\frac{1}{2}$	18/	19/9$\frac{3}{4}$	21/7$\frac{1}{4}$	23/4$\frac{3}{4}$	25/2$\frac{1}{2}$	27/	28/9$\frac{3}{4}$	30/7$\frac{1}{4}$	32/5	34/2$\frac{1}{2}$	36/0$\frac{1}{4}$
2$\frac{5}{8}$	21	10	6	0	9	$4\frac{1}{2}$	22	7	$10\frac{1}{2}$	11/3$\frac{3}{4}$	13/2$\frac{1}{2}$	15/1$\frac{1}{4}$	16/11$\frac{3}{4}$	18/10$\frac{1}{2}$	20/9	22/7$\frac{3}{4}$	24/6$\frac{1}{2}$	26/5	28/3$\frac{3}{4}$	30/2$\frac{1}{2}$	32/1	33/11$\frac{3}{4}$	35/10$\frac{1}{4}$	37/9
2$\frac{3}{4}$	22	11	0	0	9	$4\frac{1}{2}$	23	8	$4\frac{1}{2}$	11/10	13/9$\frac{3}{4}$	15/9$\frac{1}{2}$	17/9$\frac{1}{4}$	19/8$\frac{3}{4}$	21/8$\frac{1}{2}$	23/8$\frac{1}{4}$	25/8	27/7$\frac{3}{4}$	29/7$\frac{1}{4}$	31/7	33/6$\frac{3}{4}$	35/6$\frac{1}{2}$	37/6$\frac{1}{4}$	39/5$\frac{3}{4}$
2$\frac{7}{8}$	23	11	6	0	9	$4\frac{1}{2}$	24	8	$10\frac{1}{2}$	12/4$\frac{1}{4}$	14/5	16/5$\frac{3}{4}$	18/6$\frac{1}{2}$	20/7$\frac{1}{4}$	22/8	24/8$\frac{3}{4}$	26/9$\frac{1}{2}$	28/10$\frac{1}{4}$	30/11	32/11$\frac{3}{4}$	35/0$\frac{1}{2}$	37/1$\frac{1}{4}$	39/2	41/2$\frac{3}{4}$
3	25	0	0	0	9	$4\frac{1}{2}$	25	9	$4\frac{1}{2}$	12/10$\frac{1}{2}$	15/0$\frac{1}{4}$	17/2$\frac{1}{4}$	19/4	21/5$\frac{3}{4}$	23/7$\frac{1}{2}$	25/9$\frac{1}{4}$	27/11	30/0$\frac{3}{4}$	32/2$\frac{1}{2}$	34/4$\frac{1}{2}$	36/6$\frac{1}{4}$	38/8	40/9$\frac{3}{4}$	42/11$\frac{1}{2}$

* *i.e.* When each saw-draught is $\frac{3}{32}$ inch thick; or when the saw-draught, with additional thickness given to each board, amounts to $\frac{3}{32}$ inch thick.

TABLE XXV.

Showing the Value of 100 Superficial Feet Boards.

Thickness of board.	Net solid content.			$\frac{1}{8}$ inch lost in sawing.*			Gross solid content.			When the buying price of the rough timber, loss in manufacture, and expenses, amount per cubic foot to												
										6-pence	7-pence.	8-pence.	9-pence.	10-pence.	11-pence.	12-pence.	13-pence.	14-pence.	15-pence.	16-pence.	17-pence.	18-pence.	19-pence.	20-pence.
inches.	ft.	in.	pts	ft.	in.	pts	ft.	in.	pts															
$\frac{3}{8}$	3	1	6	1	0	6	4	2	0	2/1	2/5	2/9¼	3/1½	3/5½	3/9¾	4/2	4/6	4/10¼	5/2½	5/6½	5/10¾	6/3	6/7	6/11¼
$\frac{1}{2}$	4	2	0	1	0	6	5	2	6	2/7¼	3/0¼	3/5½	3/10¾	4/4	4/9¼	5/2½	5/7½	6/0¾	6/6	6/11¼	7/4½	7/9¾	8/2¾	8/8
$\frac{5}{8}$	5	2	6	1	0	6	6	3	0	3/1½	3/7¾	4/2	4/8¼	5/2½	5/8¾	6/3	6/9¼	7/3½	7/9¾	8/4	8/10¼	9/4½	9/10¾	10/5
$\frac{3}{4}$	6	3	0	1	0	6	7	3	6	3/7¾	4/3	4/10¼	5/5½	6/0¾	6/8	7/3½	7/10¾	8/6	9/1¼	9/8½	10/3¾	10/11¼	11/6½	12/1¾
$\frac{7}{8}$	7	3	6	1	0	6	8	4	0	4/2	4/10¼	5/6½	6/3	6/11¼	7/7½	8/4	9/0¼	9/8½	10/5	11/1¼	11/9½	12/6	13/2¼	13/10½
1	8	4	0	1	0	6	9	4	6	4/8¼	5/5½	6/3	7/0¼	7/9¾	8/7	9/4½	10/1¾	10/11¼	11/8½	12/6	13/3¼	14/0¾	14/10	15/7½
1⅛	9	4	6	1	0	6	10	5	0	5/2⅛	6/0¾	6/11¼	7/9¾	8/8	9/6½	10/5	11/3¼	12/1¾	13/0¼	13/10½	14/9	15/7½	16/5¾	17/4¼
1¼	10	5	0	1	0	6	11	5	6	5/8¾	6/8	7/7½	8/7	9/6½	10/6	11/5½	12/4¾	13/4¼	14/3¾	15/3¼	16/2¾	17/2¼	18/1⅝	19/1
1⅜	11	5	6	1	0	6	12	6	0	6/3	7/3½	8/4	9/4½	10/5	11/5½	12/6	13/6½	14/7	15/7½	16/8	17/8½	18/9	19/9⅞	20/10
1½	12	6	0	1	0	6	13	6	6	6/9¼	7/10¾	9/0¼	10/1¾	11/3¼	12/4¾	13/6½	14/8	15/9½	16/11	18/0½	19/2	20/3¾	21/5¼	22/6¾
1⅝	13	6	6	1	0	6	14	7	0	7/3½	8/6	9/8½	10/11¼	12/1¾	13/4¼	14/7	15/9½	17/	18/2¾	19/5¼	20/7¾	21/10½	23/1	24/3½
1¾	14	7	0	1	0	6	15	7	6	7/9¾	9/1¼	10/5	11/8½	13/0¼	14/3¾	15/7½	16/11	18/2¾	19/6¼	20/10	22/1½	23/5¼	24/8¾	26/0⅞
1⅞	15	7	6	1	0	6	16	8	0	8/4	9/8½	11/1¼	12/6	13/10½	15/3¼	16/8	18/0½	19/5¼	20/10	22/2½	23/7¼	25/	26/4½	27/9¼
2	16	8	0	1	0	6	17	8	6	8/10¼	10/3¾	11/9½	13/3¼	14/9	16/2¾	17/8½	19/2	20/7¾	22/1½	23/7¼	25/1	26/6¾	28/0¼	29/6
2⅛	17	8	6	1	0	6	18	9	0	9/4½	10/11¼	12/6	14/0¾	15/7½	17/2¼	18/9	20/3¾	21/10½	23/5¼	25/	26/6¾	28/1½	29/8¼	31/3
2¼	18	9	0	1	0	6	19	9	6	9/10¾	11/6½	13/2¼	14/10	16/5¾	18/1½	19/9½	21/5¼	23/1	24/8¾	26/4½	28/0¼	29/8¼	31/4	32/11¾
2⅜	19	9	6	1	0	6	20	10	0	10/5	12/1¾	13/10½	15/7½	17/4¼	19/1	20/10	22/6¾	24/3½	26/0½	27/9¼	29/6	31/3	32/11¾	34/8½
2½	20	10	0	1	0	6	21	10	6	10/11¼	12/9	14/7	16/4¾	18/2¾	20/0½	21/10½	23/8¼	25/6¼	27/4	29/2	30/11¾	32/9¾	34/7½	36/5⅞
2⅝	21	10	6	1	0	6	22	11	0	11/5½	13/4¼	15/3¼	17/2¼	19/1	21/	22/11	24/9¾	26/8¾	28/7¾	30/6½	32/5½	34/4⅝	36/3¼	38/2¼
2¾	22	11	0	1	0	6	23	11	6	11/11¾	13/11½	15/11½	17/11½	19/11½	21/11½	23/11½	25/11¼	27/11¼	29/11¼	31/11¼	33/11¼	35/11¼	37/11	39/11
2⅞	23	11	6	1	0	6	25	0	0	12/6	14/7	16/8	18/9	20/10	22/11	25/	27/1	29/2	31/3	33/4	35/5	37/6	39/7	41/8
3	25	0	0	1	0	6	26	0	6	13/0¼	15/2¼	17/4¼	19/6¼	21/8¼	23/10¼	26/0½	28/2½	30/4½	32/6½	34/8½	36/10½	39/0¾	41/2¾	43/4¾

* *i. e.* When each saw-draught is $\frac{1}{8}$ inch thick; or when the saw-draught, with additional thickness given to each board, amounts to $\frac{1}{8}$ inch thick.

TABLE XXVI.

Showing the Value of 100 Superficial Feet Boards.

Thickness of boards.	Net solid content.			$\frac{5}{32}$ inch lost in sawing.*			Gross solid content.			When the buying price of the rough timber, loss in manufacturing, and expenses, amount per cubic foot to												
										6-pence.	7-pence.	8-pence.	9-pence.	10-pence.	11-pence.	12-pence.	13-pence.	14-pence.	15-pence.	16-pence.	17-pence.	18-pence.	19-pence.	20-pence.
inches.	ft.	in.	pts	ft.	in.	pts	ft.	in.	pts															
$\frac{3}{8}$	3	1	6	1	3	$7\frac{1}{2}$	4	5	$1\frac{1}{2}$	2/2$\frac{1}{2}$	2/6$\frac{3}{4}$	2/11$\frac{1}{4}$	3/3$\frac{3}{4}$	3/8$\frac{1}{4}$	4/0$\frac{1}{2}$	4/5	4/9$\frac{1}{2}$	5/1$\frac{3}{4}$	5/6$\frac{1}{4}$	5/10$\frac{3}{4}$	6/3$\frac{1}{4}$	6/7$\frac{1}{2}$	7/0	7/4$\frac{1}{2}$
$\frac{1}{2}$	4	2	0	1	3	$7\frac{1}{2}$	5	5	$7\frac{1}{2}$	2/8$\frac{3}{4}$	3/2$\frac{1}{4}$	3/7$\frac{3}{4}$	4/1	4/6$\frac{1}{2}$	5/	5/5$\frac{1}{2}$	5/11	6/4$\frac{1}{2}$	6/10	7/3$\frac{1}{2}$	7/8$\frac{3}{4}$	8/2$\frac{1}{4}$	8/7$\frac{3}{4}$	9/1$\frac{1}{4}$
$\frac{5}{8}$	5	2	6	1	3	$7\frac{1}{2}$	6	6	$1\frac{1}{2}$	3/3	3/9$\frac{1}{2}$	4/4	4/10$\frac{1}{2}$	5/5	5/11$\frac{1}{2}$	6/6	7/0$\frac{1}{2}$	7/7	8/1$\frac{1}{2}$	8/8	9/2$\frac{1}{2}$	9/9	10/3$\frac{1}{2}$	10/10
$\frac{3}{4}$	6	3	0	1	3	$7\frac{1}{2}$	7	6	$7\frac{1}{2}$	3/9$\frac{1}{4}$	4/4$\frac{3}{4}$	5/0$\frac{1}{4}$	5/7$\frac{3}{4}$	6/3$\frac{1}{2}$	6/11	7/6$\frac{1}{2}$	8/2	8/9$\frac{1}{2}$	9/5$\frac{1}{4}$	10/0$\frac{3}{4}$	10/8$\frac{1}{4}$	11/3$\frac{3}{4}$	11/11$\frac{1}{4}$	12/7
$\frac{7}{8}$	7	3	6	1	3	$7\frac{1}{2}$	8	7	$1\frac{1}{2}$	4/3$\frac{1}{2}$	5/	5/8$\frac{3}{4}$	6/5$\frac{1}{4}$	7/1$\frac{3}{4}$	7/10$\frac{1}{2}$	8/7	9/3$\frac{1}{2}$	10/0$\frac{1}{4}$	10/8$\frac{3}{4}$	11/5$\frac{1}{2}$	12/2	12/10$\frac{1}{2}$	13/7$\frac{1}{4}$	14/3$\frac{3}{4}$
1	8	4	0	1	3	$7\frac{1}{2}$	9	7	$7\frac{1}{2}$	4/9$\frac{3}{4}$	5/7$\frac{1}{4}$	6/5	7/2$\frac{1}{2}$	8/0$\frac{1}{4}$	8/9$\frac{3}{4}$	9/7$\frac{1}{2}$	10/5$\frac{1}{4}$	11/2$\frac{3}{4}$	12/0$\frac{1}{2}$	12/10	13/7$\frac{3}{4}$	14/5$\frac{1}{4}$	15/2	15/11$\frac{1}{2}$
1$\frac{1}{8}$	9	4	6	1	3	$7\frac{1}{2}$	10	8	$1\frac{1}{2}$	5/4	6/2$\frac{1}{2}$	7/1$\frac{1}{4}$	8/	8/10$\frac{3}{4}$	9/9$\frac{1}{4}$	10/8	11/6$\frac{3}{4}$	12/5$\frac{1}{4}$	13/4	14/3$\frac{3}{4}$	15/1$\frac{1}{2}$	16/	16/10$\frac{3}{4}$	17/9$\frac{1}{2}$
1$\frac{1}{4}$	10	5	0	1	3	$7\frac{1}{2}$	11	8	$7\frac{1}{2}$	5/10$\frac{1}{4}$	6/10	7/9$\frac{3}{4}$	8/9$\frac{1}{4}$	9/9	10/8$\frac{3}{4}$	11/8$\frac{1}{2}$	12/8$\frac{1}{4}$	13/8	14/7$\frac{3}{4}$	15/7$\frac{1}{2}$	16/7	17/6$\frac{3}{4}$	18/6$\frac{1}{2}$	19/6$\frac{1}{4}$
1$\frac{3}{8}$	11	5	6	1	3	$7\frac{1}{2}$	12	9	$1\frac{1}{2}$	6/4$\frac{1}{2}$	7/5$\frac{1}{4}$	8/6	9/6$\frac{3}{4}$	10/7$\frac{1}{2}$	11/8$\frac{1}{4}$	12/9	13/9$\frac{3}{4}$	14/10$\frac{1}{2}$	15/11$\frac{1}{4}$	17/	18/0$\frac{3}{4}$	19/1$\frac{1}{2}$	20/2$\frac{1}{4}$	21/3
1$\frac{1}{2}$	12	6	0	1	3	$7\frac{1}{2}$	13	9	$7\frac{1}{2}$	6/10$\frac{3}{4}$	8/0$\frac{1}{2}$	9/2$\frac{1}{4}$	10/4	11/6	12/7$\frac{3}{4}$	13/9$\frac{1}{2}$	14/11$\frac{1}{4}$	16/1	17/3	18/4$\frac{3}{4}$	19/6$\frac{1}{2}$	20/8$\frac{1}{4}$	21/10	23/
1$\frac{5}{8}$	13	6	6	1	3	$7\frac{1}{2}$	14	10	$1\frac{1}{2}$	7/5	8/7$\frac{3}{4}$	9/10$\frac{3}{4}$	11/1$\frac{1}{2}$	12/4$\frac{1}{4}$	13/7$\frac{1}{4}$	14/10	16/0$\frac{3}{4}$	17/3$\frac{3}{4}$	18/6$\frac{1}{2}$	19/9$\frac{1}{2}$	21/0$\frac{1}{4}$	22/3	23/6	24/8$\frac{3}{4}$
1$\frac{3}{4}$	14	7	0	1	3	$7\frac{1}{2}$	15	10	$7\frac{1}{2}$	7/11$\frac{1}{4}$	9/3	10/7	11/10$\frac{3}{4}$	13/2$\frac{3}{4}$	14/6$\frac{1}{2}$	15/10$\frac{1}{2}$	17/2$\frac{1}{2}$	18/6$\frac{1}{4}$	19/10$\frac{1}{4}$	21/2	22/6	23/9$\frac{3}{4}$	25/1$\frac{3}{4}$	26/5$\frac{1}{2}$
1$\frac{7}{8}$	15	7	6	1	3	$7\frac{1}{2}$	16	11	$1\frac{1}{2}$	8/5$\frac{1}{2}$	9/10$\frac{1}{4}$	11/3$\frac{1}{4}$	12/8$\frac{1}{4}$	14/1$\frac{1}{4}$	15/6	16/11	18/4	19/8$\frac{3}{4}$	21/1$\frac{3}{4}$	22/6$\frac{3}{4}$	23/11$\frac{3}{4}$	25/4$\frac{1}{2}$	26/9$\frac{1}{2}$	28/2$\frac{1}{2}$
2	16	8	0	1	3	$7\frac{1}{2}$	17	11	$7\frac{1}{2}$	8/11$\frac{3}{4}$	10/5$\frac{3}{4}$	11/11$\frac{3}{4}$	13/5$\frac{1}{2}$	14/11$\frac{1}{2}$	16/5$\frac{1}{2}$	17/11$\frac{1}{2}$	19/5$\frac{1}{2}$	20/11$\frac{1}{2}$	22/5$\frac{1}{2}$	23/11$\frac{1}{2}$	25/5$\frac{1}{4}$	26/11$\frac{1}{4}$	28/5$\frac{1}{4}$	29/11$\frac{1}{4}$
2$\frac{1}{8}$	17	8	6	1	3	$7\frac{1}{2}$	19	0	$1\frac{1}{2}$	9/6	11/1	12/8	14/3	15/10	17/5	19/	20/7	22/2	23/9	25/4	26/11	28/6	30/1	31/8
2$\frac{1}{4}$	18	9	0	1	3	$7\frac{1}{2}$	20	0	$7\frac{1}{2}$	10/0$\frac{1}{4}$	11/8$\frac{1}{4}$	13/4$\frac{1}{4}$	15/0$\frac{1}{4}$	16/8$\frac{1}{2}$	18/4$\frac{1}{2}$	20/0$\frac{1}{2}$	21/8$\frac{1}{2}$	23/4$\frac{1}{2}$	25/0$\frac{3}{4}$	26/8$\frac{3}{4}$	28/4$\frac{3}{4}$	30/0$\frac{3}{4}$	31/8$\frac{3}{4}$	33/5
2$\frac{3}{8}$	19	9	6	1	3	$7\frac{1}{2}$	21	1	$1\frac{1}{2}$	10/6$\frac{1}{2}$	12/3$\frac{1}{2}$	14/0$\frac{3}{4}$	15/9$\frac{3}{4}$	17/6$\frac{3}{4}$	19/4	21/1	22/10	24/7$\frac{1}{4}$	26/4$\frac{1}{4}$	28/1$\frac{1}{2}$	29/10$\frac{1}{2}$	31/7$\frac{1}{2}$	33/4$\frac{3}{4}$	35/1$\frac{3}{4}$
2$\frac{1}{2}$	20	10	0	1	3	$7\frac{1}{2}$	22	1	$7\frac{1}{2}$	11/0$\frac{3}{4}$	12/10$\frac{3}{4}$	14/9	16/7	18/5$\frac{1}{4}$	20/3$\frac{1}{4}$	22/1$\frac{1}{2}$	23/11$\frac{3}{4}$	25/9$\frac{3}{4}$	27/8	29/6	31/4$\frac{1}{4}$	33/2$\frac{1}{4}$	35/0$\frac{1}{2}$	36/10$\frac{1}{2}$
2$\frac{5}{8}$	21	10	6	1	3	$7\frac{1}{2}$	23	2	$1\frac{1}{2}$	11/7	13/6	15/5$\frac{1}{4}$	17/4$\frac{1}{2}$	19/3$\frac{3}{4}$	21/2$\frac{3}{4}$	23/2	25/1$\frac{1}{4}$	27/0$\frac{1}{4}$	28/11$\frac{1}{2}$	30/10$\frac{3}{4}$	32/10	34/9	36/8$\frac{1}{4}$	38/7$\frac{1}{2}$
2$\frac{3}{4}$	22	11	0	1	3	$7\frac{1}{2}$	24	2	$7\frac{1}{2}$	12/1$\frac{1}{4}$	14/1$\frac{1}{2}$	16/1$\frac{3}{4}$	18/1$\frac{3}{4}$	20/2	22/2$\frac{1}{4}$	24/2$\frac{1}{2}$	26/2$\frac{3}{4}$	28/3	30/3$\frac{1}{4}$	32/3$\frac{1}{2}$	34/3$\frac{1}{2}$	36/3$\frac{3}{4}$	38/4	40/4$\frac{1}{4}$
2$\frac{7}{8}$	23	11	6	1	3	$7\frac{1}{2}$	25	3	$1\frac{1}{2}$	12/7$\frac{1}{2}$	14/8$\frac{3}{4}$	16/10	18/11$\frac{1}{4}$	21/0$\frac{1}{2}$	23/1$\frac{3}{4}$	25/3	27/4$\frac{1}{4}$	29/5$\frac{1}{2}$	31/6$\frac{3}{4}$	33/8	35/9$\frac{1}{4}$	37/10$\frac{1}{2}$	39/11$\frac{3}{4}$	42/1
3	25	0	0	1	3	$7\frac{1}{2}$	26	3	$7\frac{1}{2}$	13/1$\frac{3}{4}$	15/4	17/6$\frac{1}{4}$	19/8$\frac{1}{2}$	21/11	24/1$\frac{1}{4}$	26/3$\frac{1}{2}$	28/5$\frac{5}{4}$	30/8	32/10$\frac{1}{2}$	35/0$\frac{3}{4}$	37/3	39/5$\frac{1}{4}$	41/7$\frac{1}{2}$	43/10

* *i. e.* When each saw-draught is $\frac{5}{32}$ inch thick; or when the saw-draught, with additional thickness given to each board, amounts to $\frac{5}{32}$ inch thick.

TABLE XXVII.

Showing the VALUE of 100 SUPERFICIAL FEET BOARDS.

Thickness of board.	Net solid content.			$\frac{3}{16}$ inch lost in sawing.*			Gross solid content.			When the buying price of the rough timber, loss in manufacturing, and expenses, amount per cubic foot to											
										6-pence.	7-pence.	8-pence.	9-pence.	10-pence.	11-pence.	12-pence.	13-pence.	14-pence.	15-penee.	16-pence.	17-pence.	18-pence.	19-pence.	20-pence.
inches.	ft.	in.	pts	ft.	in.	pts	ft.	in.	pts															
$\frac{3}{8}$	3	1	6	1	6	9	4	8	3	2/4	2/8$\frac{3}{4}$	3/1$\frac{1}{2}$	3/6	3/10$\frac{3}{4}$	4/3$\frac{1}{2}$	4/8$\frac{1}{4}$	5/0$\frac{3}{4}$	5/5$\frac{1}{2}$	5/10$\frac{1}{4}$	6/3	6/7$\frac{1}{2}$	7/0$\frac{1}{4}$	7/5	7/9$\frac{3}{4}$
$\frac{1}{2}$	4	2	0	1	6	9	5	8	9	2/10$\frac{1}{4}$	3/4	3/9$\frac{3}{4}$	4/3$\frac{1}{2}$	4/9$\frac{1}{4}$	5/3	5/8$\frac{3}{4}$	6/2$\frac{1}{4}$	6/8	7/1$\frac{3}{4}$	7/7$\frac{1}{2}$	8/1$\frac{1}{4}$	8/7	9/0$\frac{3}{4}$	9/6$\frac{1}{2}$
$\frac{5}{8}$	5	2	6	1	6	9	6	9	3	3/4$\frac{1}{2}$	3/11$\frac{1}{4}$	4/6	5/0$\frac{3}{4}$	5/7$\frac{1}{2}$	6/2$\frac{1}{4}$	6/9$\frac{1}{4}$	7/4	7/10$\frac{3}{4}$	8/5$\frac{1}{2}$	9/0$\frac{1}{4}$	9/7	10/1$\frac{3}{4}$	10/8$\frac{1}{2}$	11/3$\frac{1}{4}$
$\frac{3}{4}$	6	3	0	1	6	9	7	9	9	3/10$\frac{3}{4}$	4/6$\frac{1}{2}$	5/2$\frac{1}{2}$	5/10$\frac{1}{4}$	6/6	7/1$\frac{3}{4}$	7/9$\frac{3}{4}$	8/5$\frac{1}{2}$	9/1$\frac{1}{4}$	9/9	10/5	11/0$\frac{3}{4}$	11/8$\frac{1}{2}$	12/4$\frac{1}{4}$	13/0$\frac{1}{4}$
$\frac{7}{8}$	7	3	6	1	6	9	8	10	3	4/5	5/1$\frac{3}{4}$	5/10$\frac{3}{4}$	6/7$\frac{1}{2}$	7/4$\frac{1}{2}$	8/1$\frac{1}{4}$	8/10$\frac{1}{4}$	9/7	10/3$\frac{3}{4}$	11/0$\frac{3}{4}$	11/9$\frac{1}{2}$	12/6$\frac{1}{2}$	13/3$\frac{1}{4}$	14/	14/9
1	8	4	0	1	6	9	9	10	9	4/11$\frac{1}{4}$	5/9$\frac{1}{4}$	6/7	7/5	8/2$\frac{3}{4}$	9/0$\frac{3}{4}$	9/10$\frac{3}{4}$	10/8$\frac{1}{2}$	11/6$\frac{1}{2}$	12/4$\frac{1}{4}$	13/2$\frac{1}{4}$	14/	14/10	15/8	16/5$\frac{3}{4}$
1$\frac{1}{8}$	9	4	6	1	6	9	10	11	3	5/5$\frac{1}{2}$	6/4$\frac{1}{2}$	7/3$\frac{1}{2}$	8/2$\frac{1}{4}$	9/1$\frac{1}{4}$	10/0$\frac{1}{4}$	10/11$\frac{1}{4}$	11/10	12/9	13/8	14/7	15/5$\frac{3}{4}$	16/4$\frac{3}{4}$	17/3$\frac{3}{4}$	18/2$\frac{3}{4}$
1$\frac{1}{4}$	10	5	0	1	6	9	11	11	9	5/11$\frac{3}{4}$	6/11$\frac{3}{4}$	7/11$\frac{3}{4}$	8/11$\frac{3}{4}$	9/11$\frac{3}{4}$	10/11$\frac{3}{4}$	11/11$\frac{3}{4}$	12/11$\frac{1}{2}$	13/11$\frac{1}{2}$	14/11$\frac{1}{2}$	15/11$\frac{1}{2}$	16/11$\frac{1}{2}$	17/11$\frac{1}{2}$	18/11$\frac{1}{2}$	19/11$\frac{1}{2}$
1$\frac{3}{8}$	11	5	6	1	6	9	13	0	3	6/6	7/7	8/8	9/9	10/10	11/11	13/0$\frac{1}{4}$	14/1$\frac{1}{4}$	15/2$\frac{1}{4}$	16/3$\frac{1}{4}$	17/4$\frac{1}{4}$	18/5$\frac{1}{4}$	19/6$\frac{1}{4}$	20/7$\frac{1}{4}$	21/8$\frac{1}{4}$
1$\frac{1}{2}$	12	6	0	1	6	9	14	0	9	7/0$\frac{1}{4}$	8/2$\frac{1}{4}$	9/4$\frac{1}{2}$	10/6$\frac{1}{2}$	11/8$\frac{1}{2}$	12/10$\frac{1}{2}$	14/0$\frac{3}{4}$	15/2$\frac{3}{4}$	16/4$\frac{3}{4}$	17/6$\frac{3}{4}$	18/9	19/11	21/1	22/3	23/5$\frac{1}{4}$
1$\frac{5}{8}$	13	6	6	1	6	9	15	1	3	7/6$\frac{1}{2}$	8/9$\frac{1}{2}$	10/0$\frac{3}{4}$	11/3$\frac{3}{4}$	12/7	13/10	15/1$\frac{1}{4}$	16/4$\frac{1}{4}$	17/7$\frac{1}{4}$	18/10$\frac{1}{2}$	20/1$\frac{1}{2}$	21/4$\frac{3}{4}$	22/7$\frac{3}{4}$	23/10$\frac{3}{4}$	25/2
1$\frac{3}{4}$	14	7	0	1	6	9	16	1	9	8/0$\frac{3}{4}$	9/5	10/9	12/1$\frac{1}{4}$	13/5$\frac{1}{4}$	14/9$\frac{1}{2}$	16/1$\frac{3}{4}$	17/5$\frac{3}{4}$	18/10	20/2	21/6$\frac{1}{4}$	22/10$\frac{1}{2}$	24/2$\frac{1}{2}$	25/6$\frac{3}{4}$	26/10$\frac{3}{4}$
1$\frac{7}{8}$	15	7	6	1	6	9	17	2	3	8/7	10/0$\frac{1}{4}$	11/5$\frac{1}{2}$	12/10$\frac{1}{2}$	14/3$\frac{3}{4}$	15/9	17/2$\frac{1}{4}$	18/7$\frac{1}{4}$	20/0$\frac{1}{2}$	21/5$\frac{3}{4}$	22/11	24/4	25/9$\frac{1}{4}$	27/2$\frac{1}{2}$	28/7$\frac{3}{4}$
2	16	8	0	1	6	9	18	2	9	9/1$\frac{1}{4}$	10/7$\frac{1}{2}$	12/1$\frac{3}{4}$	13/8	15/2$\frac{1}{4}$	16/8$\frac{1}{2}$	18/2$\frac{3}{4}$	19/8$\frac{3}{4}$	21/3	22/9$\frac{1}{4}$	24/3$\frac{1}{2}$	25/9$\frac{3}{4}$	27/4	28/10$\frac{1}{4}$	30/4$\frac{1}{2}$
2$\frac{1}{8}$	17	8	6	1	6	9	19	3	3	9/7$\frac{1}{2}$	11/2$\frac{3}{4}$	12/10	14/5$\frac{1}{4}$	16/0$\frac{1}{2}$	17/7$\frac{3}{4}$	19/3$\frac{1}{4}$	20/10$\frac{1}{2}$	22/5$\frac{3}{4}$	24/1	25/8$\frac{1}{4}$	27/3$\frac{1}{2}$	28/10$\frac{3}{4}$	30/6	32/1$\frac{1}{4}$
2$\frac{1}{4}$	18	9	0	1	6	9	20	3	9	10/1$\frac{3}{4}$	11/10	13/6$\frac{1}{2}$	15/2$\frac{3}{4}$	16/11	18/7$\frac{1}{4}$	20/3$\frac{3}{4}$	22/	23/8$\frac{1}{4}$	25/4$\frac{1}{2}$	27/1	28/9$\frac{1}{4}$	30/5$\frac{1}{2}$	32/1$\frac{3}{4}$	33/10$\frac{1}{4}$
2$\frac{3}{8}$	19	9	6	1	6	9	21	4	3	10/8	12/5$\frac{1}{4}$	14/2$\frac{3}{4}$	16/	17/9$\frac{1}{2}$	19/6$\frac{3}{4}$	21/4$\frac{1}{4}$	23/1$\frac{1}{2}$	24/10$\frac{3}{4}$	26/8$\frac{1}{4}$	28/5$\frac{1}{2}$	30/3	32/0$\frac{1}{4}$	33/9$\frac{1}{2}$	35/7
2$\frac{1}{2}$	20	10	0	1	6	9	22	4	9	11/2$\frac{1}{4}$	13/0$\frac{3}{4}$	14/11	16/9$\frac{1}{2}$	18/7$\frac{3}{4}$	20/6$\frac{1}{4}$	22/4$\frac{3}{4}$	24/3	26/1$\frac{1}{2}$	27/11$\frac{3}{4}$	29/10$\frac{1}{4}$	31/8$\frac{1}{2}$	33/7	35/5$\frac{1}{2}$	37/3$\frac{3}{4}$
2$\frac{5}{8}$	21	10	6	1	6	9	23	5	3	11/8$\frac{1}{2}$	13/8	15/7$\frac{1}{3}$	17/6$\frac{3}{4}$	19/6$\frac{1}{4}$	21/5$\frac{3}{4}$	23/5$\frac{1}{4}$	25/4$\frac{1}{2}$	27/4	29/3$\frac{1}{2}$	31/3	33/2$\frac{1}{4}$	35/1$\frac{3}{4}$	37/1$\frac{1}{4}$	39/0$\frac{3}{4}$
2$\frac{3}{4}$	22	11	0	1	6	9	24	5	9	12/2$\frac{3}{4}$	14/3$\frac{1}{4}$	16/3$\frac{3}{4}$	18/4$\frac{1}{4}$	20/4$\frac{3}{4}$	22/5$\frac{1}{4}$	24/5$\frac{3}{4}$	26/6	28/6$\frac{1}{2}$	30/7	32/7$\frac{1}{2}$	34/8	36/8$\frac{1}{2}$	38/8$\frac{3}{4}$	40/9$\frac{1}{4}$
2$\frac{7}{8}$	23	11	6	1	6	9	25	6	3	12/9	14/10$\frac{1}{2}$	17/	19/1$\frac{1}{2}$	21/3	23/4$\frac{1}{2}$	25/6$\frac{1}{4}$	27/7$\frac{3}{4}$	29/9$\frac{1}{4}$	31/10$\frac{3}{4}$	34/0$\frac{1}{4}$	36/1$\frac{3}{4}$	38/3$\frac{1}{4}$	40/4$\frac{3}{4}$	42/6$\frac{1}{4}$
3	25	0	0	1	6	9	26	6	9	13/3$\frac{1}{4}$	15/5$\frac{3}{4}$	17/8$\frac{1}{2}$	19/11	22/1$\frac{1}{2}$	24/4	26/6$\frac{3}{4}$	28/9$\frac{1}{4}$	30/11$\frac{3}{4}$	33/2$\frac{1}{4}$	35/5	37/7$\frac{1}{2}$	39/10	42/0$\frac{1}{2}$	44/3$\frac{1}{4}$

* *i. e.* When each saw-draught is $\frac{3}{16}$ inch thick; or when the saw-draught, with additional thickness given to each board, amounts to $\frac{3}{16}$ inch thick.

REMARKS ON TABLES XXIII., XXIV., XXV., XXVI., XXVII.

Relative value of boards.

These five Tables form one set, and may be explained together. The left-hand column gives the various thicknesses of boards and planks treated of—from $\frac{3}{8}$ to 3 inches thick. The next three columns, headed "feet, inches, parts," give the solid content of 100 superficial feet of boards opposite their respective thicknesses. The next three columns, also headed "feet, inches, parts," give the solid content of the wood lost by the action of the saw in cutting 100 superficial feet; or that loss added to another arising from some slight addition to the thickness of each board. Thus, if the saw cuts out $\frac{3}{32}$ inch, and an addition of $\frac{1}{16}$ inch is given to the thickness of the manufactured board, the whole loss to the seller is $\frac{5}{32}$ inch each draught. The next three columns, also headed "feet, inches, parts," give the gross solid content required to produce 100 superficial feet of boards. The sums in the columns headed "6-pence, 7-pence," &c., are the respective prices of 100 feet boards when the value per cubic foot is as given in this upper line of figures. The use of these Tables will be more easily illustrated and understood by a few examples:—

If the purchaser of a cubic foot of timber pay—

	s.	*d.*
Purchase price in plantation, . .	0	6
Felling, ...	0	$0\frac{1}{4}$
Transport, ...	0	$1\frac{1}{4}$
Sawing, ...	0	$2\frac{1}{2}$
Marketing, time, interest of money, and incidental expenses, ...	0	2
Total, ...	1	0 for a cubic foot,

At what price can he afford to sell 100 superficial feet boards, each $\frac{3}{8}$ inch thick? and at what price 100 superficial feet boards, each 1 inch thick?

	$\frac{3}{8}$ inch.			1 inch.		
	s.	*d.*		*s.*	*d.*	
If cut up by a saw taking out $\frac{1}{16}$ in. (Table XXIII.)	3	$7\frac{3}{4}$	per 100 feet.	8	$10\frac{1}{4}$	per 100 feet.
,, $\frac{3}{32}$ in. (Table XXIV.)	3	$10\frac{3}{4}$	,,	9	$1\frac{1}{4}$	,,
,, $\frac{1}{8}$ in. (Table XXV.)	4	2	,,	9	$4\frac{1}{2}$	,,
,, $\frac{5}{32}$ in. (Table XXVI.)	4	5	,,	9	$7\frac{1}{2}$	,,
,, $\frac{3}{16}$ in. (Table XXVII.)	4	$8\frac{1}{4}$	,,	9	$10\frac{3}{4}$	,,

Relative advantages of manual labour and machinery.

If the saw cutting out the $\frac{3}{32}$ inch were the common verticle frame saw, worked by manual labour, and the sawing by it to cost 2s. for 100 feet $\frac{3}{8}$-inch boards; and if the saw cutting out the $\frac{5}{32}$ inch were driven by machinery, and the sawing by it to cost 6d. for the same

quantity, there could be only 11¾d. devoted to carrying the rough timber to the mill, as, although there be 1s. 6d. of difference in the expense of sawing, the greater quantity of timber lost by the saw cutting out the $\frac{5}{32}$ inch limits the difference to 11¾d.

If the value of the 100 feet of ⅜-inch boards were doubled in each case, and the expense of sawing continuing the same as before, then the difference in favour of the saw costing the smaller sum would be reduced to 5½d. If the value of the boards were in each case three times the sum first stated, then there would be a dead loss by employing the saw costing the 6d. per 100 feet in preference to that costing 2s., if they were equally convenient and accessible.

Another illustration, Table XXVI.—If 100 feet ½-inch boards cost 5s., what should 100 feet 1-inch boards cost?—Answer, 8s. 9¾d. A person unacquainted with the subject would readily imagine that it should have been 10s., forgetting that there is just about as much wood wasted by the saw in cutting 100 feet of the one as the other. These five tables, XXIII.-XXVII., with their illustrations and remarks, might be carried to any extent, but the reader, after due attention, will be able to work out what is necessary for his own purpose. By doubling one or adding two sums, he can readily find values above those which are given in the tables. Thus, What is the value of 100 feet ⅜ at 21d. (Table XXVI.)? Add the 3s. 8¼d. given under 10d. to the 4s. 0½d. given under 11d. and the sum 7s. 8¾d. is the answer.

Method of extending these tables.

It appears necessary only farther to observe that a small percentage requires to be added to the sums given in these five Tables as the thickness of the boards advances, on account of the increasing expense incurred in slabbing the increasing quantities of wood.

Timber is often sold at so much per cubic foot after being sawn; it then comes to be a question what 100 superficial feet of it is worth. Table XXVIII. shows this.

EXPLANATION OF TABLE XXVIII. (PAGE 78).

In the left-hand column will be found the various thicknesses of boards and planks treated of, ranging from ⅜ to 3 inches. In the next three columns is given the solid content of 100 superficial feet opposite the respective thicknesses. The other columns, forming the body of the table, and headed "6d., 7d.," &c., give the value per 100 feet at the price per cubic foot standing at the head of each column. Thus,

Value of boards, &c., per 100 superficial feet and per cubic foot.

TABLE XXVIII.

Showing the VALUE of 100 SUPERFICIAL FEET BOARDS.

Thickness of board.	Solid content.			When the wood is valued after manufacture, per cubic foot at																							
				6d.	7d.	8d.	9d.	10d.	11d.	12d.	13d.	14d.	15d.	16d.	17d.	18d.	19d.	20d.	21d.	22d.	23d.	24d.	25d.	26d.	27d.	28d.	29d.	30d.
inches	ft.	in.	pts																									
$\frac{1}{8}$	3	1	6	1/6$\frac{3}{4}$	1/9$\frac{3}{4}$	2/1	2/4$\frac{1}{2}$	2/7$\frac{1}{2}$	2/10$\frac{1}{2}$	3/1$\frac{1}{2}$	3/4$\frac{3}{4}$	3/7$\frac{3}{4}$	3/11	4/2	4/5$\frac{1}{4}$	4/8$\frac{1}{4}$	4/11$\frac{1}{2}$	5/2$\frac{1}{2}$	5/5$\frac{3}{4}$	5/8$\frac{3}{4}$	6/	6/3	6/6$\frac{1}{4}$	6/9$\frac{1}{4}$	7/0$\frac{1}{2}$	7/3$\frac{1}{2}$	7/6$\frac{3}{4}$	7/9$\frac{3}{4}$
$\frac{1}{4}$	4	2	0	2/1	2/5$\frac{1}{4}$	2/9$\frac{1}{2}$	3/1$\frac{1}{2}$	3/5$\frac{3}{4}$	3/10	4/2	4/6$\frac{1}{4}$	4/10$\frac{1}{2}$	5/2$\frac{1}{2}$	5/6$\frac{3}{4}$	5/11	6/3	6/7$\frac{1}{4}$	6/11$\frac{1}{2}$	7/3$\frac{1}{2}$	7/7$\frac{3}{4}$	8/	8/4	8/8$\frac{1}{4}$	9/0$\frac{1}{2}$	9/4$\frac{1}{2}$	9/8$\frac{3}{4}$	10/1	10/5
$\frac{3}{8}$	5	2	6	2/7$\frac{1}{4}$	3/0$\frac{1}{2}$	3/5$\frac{3}{4}$	3/11	4/4$\frac{1}{2}$	4/9$\frac{1}{2}$	5/2$\frac{1}{2}$	5/7$\frac{3}{4}$	6/1	6/6$\frac{1}{4}$	6/11$\frac{1}{2}$	7/4$\frac{3}{4}$	7/9$\frac{3}{4}$	8/3	8/8$\frac{1}{4}$	9/1$\frac{1}{2}$	9/6$\frac{3}{4}$	10/	10/5	10/10$\frac{1}{4}$	11/3$\frac{1}{2}$	11/8$\frac{3}{4}$	12/2	12/7$\frac{1}{4}$	13/0$\frac{1}{4}$
$\frac{1}{2}$	6	3	0	3/1$\frac{1}{2}$	3/7$\frac{3}{4}$	4/2	4/8$\frac{1}{4}$	5/2$\frac{1}{2}$	5/8$\frac{3}{4}$	6/3	6/9$\frac{1}{4}$	7/3$\frac{1}{2}$	7/9$\frac{3}{4}$	8/4	8/10$\frac{1}{4}$	9/4$\frac{1}{2}$	9/10$\frac{3}{4}$	10/5	10/11$\frac{1}{4}$	11/5$\frac{1}{2}$	11/11$\frac{3}{4}$	12/6	13/0$\frac{1}{4}$	13/6$\frac{1}{2}$	14/0$\frac{3}{4}$	14/7	15/1$\frac{1}{4}$	15/7$\frac{1}{2}$
$\frac{5}{8}$	7	3	6	3/7$\frac{3}{4}$	4/3$\frac{1}{2}$	4/10$\frac{1}{2}$	5/5$\frac{3}{4}$	6/1	6/8$\frac{1}{4}$	7/3$\frac{1}{2}$	7/11$\frac{3}{4}$	8/6$\frac{1}{4}$	9/1$\frac{1}{2}$	9/8$\frac{3}{4}$	10/4	10/11$\frac{1}{4}$	11/6$\frac{3}{4}$	12/2	12/9$\frac{1}{4}$	13/4$\frac{1}{2}$	13/11$\frac{3}{4}$	14/7	15/2$\frac{1}{2}$	15/9$\frac{3}{4}$	16/5	17/0$\frac{1}{4}$	17/7$\frac{1}{2}$	18/2$\frac{3}{4}$
1	8	4	0	4/2	4/10$\frac{1}{2}$	5/6$\frac{3}{4}$	6/3	6/11$\frac{1}{2}$	7/7$\frac{3}{4}$	8/4	9/0$\frac{1}{2}$	9/8$\frac{3}{4}$	10/5	11/1$\frac{1}{2}$	11/9$\frac{3}{4}$	12/6	13/2$\frac{1}{2}$	13/10$\frac{3}{4}$	14/7	15/3$\frac{1}{2}$	15/11$\frac{3}{4}$	16/8	17/4$\frac{1}{2}$	18/0$\frac{3}{4}$	18/9	19/5$\frac{1}{2}$	20/1$\frac{3}{4}$	20/10
1$\frac{1}{8}$	9	4	6	4/8$\frac{1}{4}$	5/5$\frac{3}{4}$	6/3	7/0$\frac{1}{2}$	7/9$\frac{3}{4}$	8/7$\frac{1}{4}$	9/4$\frac{1}{2}$	10/2	10/11$\frac{1}{4}$	11/8$\frac{3}{4}$	12/6	13/3$\frac{1}{2}$	14/0$\frac{3}{4}$	14/10$\frac{1}{4}$	15/7$\frac{1}{2}$	16/5	17/2$\frac{1}{4}$	17/11$\frac{3}{4}$	18/9	19/6$\frac{1}{2}$	20/3$\frac{3}{4}$	21/1$\frac{1}{4}$	21/10$\frac{1}{2}$	22/8	23/5$\frac{1}{4}$
1$\frac{1}{4}$	10	5	0	5/2$\frac{1}{2}$	6/1	6/11$\frac{1}{2}$	7/9$\frac{3}{4}$	8/8$\frac{1}{4}$	9/6$\frac{3}{4}$	10/5	11/3$\frac{1}{2}$	12/2	13/0$\frac{1}{4}$	13/10$\frac{3}{4}$	14/9$\frac{1}{4}$	15/7$\frac{1}{2}$	16/6	17/4$\frac{1}{2}$	18/2$\frac{3}{4}$	19/1$\frac{1}{4}$	19/11$\frac{3}{4}$	20/10	21/8$\frac{1}{2}$	22/7	23/5$\frac{1}{4}$	24/3$\frac{3}{4}$	25/2$\frac{1}{4}$	26/0$\frac{1}{2}$
1$\frac{3}{8}$	11	5	6	5/8$\frac{3}{4}$	6/8$\frac{1}{4}$	7/7$\frac{3}{4}$	8/7$\frac{1}{4}$	9/6$\frac{3}{4}$	10/6$\frac{1}{4}$	11/5$\frac{1}{2}$	12/5	13/4$\frac{1}{2}$	14/4	15/3$\frac{1}{2}$	16/3	17/2$\frac{1}{4}$	18/1$\frac{3}{4}$	19/1$\frac{1}{4}$	20/0$\frac{3}{4}$	21/0$\frac{1}{4}$	21/11$\frac{3}{4}$	22/11	23/10$\frac{1}{2}$	24/10	25/9$\frac{1}{2}$	26/9	27/8$\frac{1}{2}$	28/7$\frac{3}{4}$
1$\frac{1}{2}$	12	6	0	6/3	7/3$\frac{1}{2}$	8/4	9/4$\frac{1}{2}$	10/5	11/5$\frac{1}{2}$	12/6	13/6$\frac{1}{2}$	14/7	15/7$\frac{1}{2}$	16/8	17/8$\frac{1}{2}$	18/9	19/9$\frac{1}{2}$	20/10	21/10$\frac{1}{2}$	22/11	23/11$\frac{1}{2}$	25/	26/0$\frac{1}{2}$	27/1	28/1$\frac{1}{2}$	29/2	30/2$\frac{1}{2}$	31/3
1$\frac{5}{8}$	13	6	6	6/9$\frac{1}{4}$	7/11	9/0$\frac{1}{2}$	10/2	11/3$\frac{1}{2}$	12/5	13/6$\frac{1}{2}$	14/8$\frac{1}{4}$	15/9$\frac{3}{4}$	16/11$\frac{1}{4}$	18/0$\frac{3}{4}$	19/2$\frac{1}{4}$	20/3$\frac{3}{4}$	21/5$\frac{1}{2}$	22/7	23/8$\frac{1}{2}$	24/10	25/11$\frac{1}{2}$	27/1	28/2$\frac{3}{4}$	29/4$\frac{1}{4}$	30/5$\frac{3}{4}$	31/7$\frac{1}{4}$	32/8$\frac{3}{4}$	33/10$\frac{1}{4}$
1$\frac{3}{4}$	14	7	0	7/3$\frac{1}{2}$	8/6$\frac{1}{4}$	9/8$\frac{3}{4}$	10/11$\frac{1}{4}$	12/2	13/4$\frac{1}{2}$	14/7	15/9$\frac{3}{4}$	17/0$\frac{1}{4}$	18/2$\frac{3}{4}$	19/5$\frac{1}{2}$	20/8	21/10$\frac{1}{2}$	23/1$\frac{1}{4}$	24/3$\frac{3}{4}$	25/6$\frac{1}{4}$	26/9	27/11$\frac{1}{2}$	29/2	30/4$\frac{3}{4}$	31/7$\frac{1}{4}$	32/9$\frac{3}{4}$	34/0$\frac{1}{2}$	35/3	36/5$\frac{1}{2}$
1$\frac{7}{8}$	15	7	6	7/9$\frac{3}{4}$	9/1$\frac{1}{2}$	10/5	11/8$\frac{3}{4}$	13/0$\frac{1}{4}$	14/4	15/7$\frac{1}{2}$	16/11$\frac{1}{4}$	18/2$\frac{3}{4}$	19/6$\frac{1}{2}$	20/10	22/1$\frac{3}{4}$	23/5$\frac{1}{4}$	24/9	26/0$\frac{1}{2}$	27/4$\frac{1}{4}$	28/7$\frac{3}{4}$	29/11$\frac{1}{2}$	31/3	32/6$\frac{3}{4}$	33/10$\frac{1}{4}$	35/2	36/5$\frac{1}{2}$	37/9$\frac{1}{4}$	39/0$\frac{3}{4}$
2	16	8	0	8/4	9/8$\frac{3}{4}$	11/1$\frac{1}{2}$	12/6	13/10$\frac{3}{4}$	15/3$\frac{1}{2}$	16/8	18/0$\frac{3}{4}$	19/5$\frac{1}{2}$	20/10	22/2$\frac{3}{4}$	23/7$\frac{1}{2}$	25/	26/4$\frac{3}{4}$	27/9$\frac{1}{2}$	29/2	30/6$\frac{3}{4}$	31/11$\frac{1}{2}$	33/4	34/8$\frac{3}{4}$	36/1$\frac{1}{2}$	37/6	38/10$\frac{3}{4}$	40/3$\frac{1}{2}$	41/8
2$\frac{1}{8}$	17	8	6	8/10$\frac{1}{4}$	10/4	11/9$\frac{3}{4}$	13/3$\frac{1}{2}$	14/9$\frac{1}{4}$	16/3	17/8$\frac{1}{2}$	19/2$\frac{1}{4}$	20/8	22/1$\frac{3}{4}$	23/7$\frac{1}{2}$	25/1$\frac{1}{4}$	26/6$\frac{3}{4}$	28/0$\frac{1}{2}$	29/6$\frac{1}{4}$	31/	32/5$\frac{3}{4}$	33/11$\frac{1}{2}$	35/5	36/10$\frac{3}{4}$	38/4$\frac{1}{2}$	39/10$\frac{1}{4}$	41/4	42/9$\frac{3}{4}$	44/3$\frac{1}{4}$
2$\frac{1}{4}$	18	9	0	9/4$\frac{1}{2}$	10/11$\frac{1}{4}$	12/6	14/0$\frac{3}{4}$	15/7$\frac{1}{2}$	17/2$\frac{1}{4}$	18/9	20/3$\frac{3}{4}$	21/10$\frac{1}{2}$	23/5$\frac{1}{4}$	25/	26/6$\frac{3}{4}$	28/1$\frac{1}{2}$	29/8$\frac{1}{4}$	31/3	32/9$\frac{3}{4}$	34/4$\frac{1}{2}$	35/11$\frac{1}{4}$	37/6	39/0$\frac{3}{4}$	40/7$\frac{1}{2}$	42/2$\frac{1}{4}$	43/9	45/3$\frac{3}{4}$	46/10$\frac{1}{2}$
2$\frac{3}{8}$	19	9	6	9/10$\frac{3}{4}$	11/6$\frac{3}{4}$	13/2$\frac{1}{2}$	14/10$\frac{1}{4}$	16/6	18/1$\frac{3}{4}$	19/9$\frac{1}{2}$	21/5$\frac{1}{2}$	23/1	24/9	26/4$\frac{3}{4}$	28/0$\frac{1}{2}$	29/8$\frac{1}{4}$	31/4$\frac{1}{4}$	33/	34/7$\frac{3}{4}$	36/3$\frac{1}{2}$	37/11$\frac{1}{4}$	39/7	41/3	42/10$\frac{3}{4}$	44/6$\frac{1}{2}$	46/2$\frac{1}{4}$	47/10	49/5$\frac{3}{4}$
2$\frac{1}{2}$	20	10	0	10/5	12/2	13/10$\frac{3}{4}$	15/7$\frac{1}{2}$	17/4$\frac{1}{2}$	19/1$\frac{1}{4}$	20/10	22/7	24/3$\frac{3}{4}$	26/0$\frac{1}{2}$	27/9$\frac{1}{2}$	29/6$\frac{1}{4}$	31/3	33/	34/8$\frac{3}{4}$	36/5$\frac{1}{2}$	38/2$\frac{1}{2}$	39/11$\frac{1}{4}$	41/8	43/5	45/1$\frac{3}{4}$	46/10$\frac{1}{2}$	48/7$\frac{1}{2}$	50/4$\frac{1}{4}$	52/1
2$\frac{5}{8}$	21	10	6	10/11$\frac{1}{4}$	12/9$\frac{1}{4}$	14/7	16/5	18/2$\frac{3}{4}$	20/0$\frac{3}{4}$	21/10$\frac{1}{2}$	23/8$\frac{1}{2}$	25/6$\frac{1}{4}$	27/4$\frac{1}{4}$	29/2	31/	32/9$\frac{3}{4}$	34/7$\frac{3}{4}$	36/5$\frac{1}{2}$	38/3$\frac{1}{2}$	40/1$\frac{1}{4}$	41/11$\frac{1}{4}$	43/9	45/7	47/4$\frac{3}{4}$	49/2$\frac{3}{4}$	51/0$\frac{1}{2}$	52/10$\frac{1}{2}$	54/8$\frac{1}{4}$
2$\frac{3}{4}$	22	11	0	11/5$\frac{1}{2}$	13/4$\frac{1}{2}$	15/3$\frac{1}{2}$	17/2$\frac{1}{4}$	19/1$\frac{1}{4}$	21/0$\frac{1}{4}$	22/11	24/10	26/9	28/7$\frac{3}{4}$	30/6$\frac{3}{4}$	32/5$\frac{3}{4}$	34/4$\frac{1}{2}$	36/3$\frac{1}{2}$	38/2$\frac{1}{2}$	40/1$\frac{1}{4}$	42/0$\frac{1}{4}$	43/11$\frac{1}{4}$	45/10	47/9	49/8	51/6$\frac{3}{4}$	53/5$\frac{3}{4}$	55/4$\frac{3}{4}$	57/3$\frac{1}{2}$
2$\frac{7}{8}$	23	11	6	11/11$\frac{3}{4}$	13/11$\frac{3}{4}$	15/11$\frac{3}{4}$	17/11$\frac{3}{4}$	19/11$\frac{3}{4}$	21/11$\frac{3}{4}$	23/11$\frac{1}{2}$	25/11$\frac{1}{2}$	27/11$\frac{1}{2}$	29/11$\frac{1}{2}$	31/11$\frac{1}{2}$	33/11$\frac{1}{2}$	35/11$\frac{1}{4}$	37/11$\frac{1}{4}$	39/11$\frac{1}{4}$	41/11$\frac{1}{4}$	43/11$\frac{1}{4}$	45/11$\frac{1}{4}$	47/11	49/11	51/11	53/11	55/11	57/11	59/10$\frac{3}{4}$
3	25	0	0	12/6	14/7	16/8	18/9	20/10	22/11	25/	27/1	29/2	31/3	33/4	35/5	37/6	39/7	41/8	43/9	45/10	47/11	50/	52/1	54/2	56/3	58/4	60/5	62/6

What is the value of 100 superficial feet boards, each an inch thick, at 24d. (2s.) per cubic foot?—Answer, 16s. 8d.

Another method of selling wood is at so much per 100 *superficial feet* for boards 1 inch thick or under, and at so much per *cubic foot* above that thickness. It thus becomes desirable to know what is a proportionate price in either case. For the purpose of bringing out this, Tables XXIII. to XXVII. and Table XXVIII. are so constructed as to work together as well as separately.

Proportionate prices—examples of method of finding.

Example 1.—If 100 superficial feet 1-inch boards, per Table XXVI., are worth 9s. 7½d., what are they worth per cubic foot? Turn to Table XXVIII. and look along line "1 inch" till the sum nearest 9s. 7½d. is reached, and at the top of that column will be found the value per cubic foot, or a close approximation to it. In this case it is 9s. 8¾d., and the price per cubic foot 1s. 2d., a small fraction under which (not ¼d.) it really is.

Example 2.—If 100 superficial feet 1-inch boards, per Table XXVI., are worth 9s. 7½d., what is the value of a cubic foot 2-inch plank at the same rate? Look down the column (Table XXVI.) till opposite "2 inches" and at the angle will be found the price per 100 feet—17s. 11½d. Then turn to Table XXVIII. and look along the line "2 inches" till the sum nearest 17s. 11½d. (in this case, 18s. 0¾d.) is found, and at the top of the column stands 1s. 1d., being a very little more than the price of a cubic foot of 2-inch plank, when the value of 100 superficial feet of inch is 9s. 7½d. The price of the 100 feet of inch boards is 9s. 7½d., the price of a cubic foot of inch boards is 1s. 2d., and the price of a cubic foot of 2-inch plank is 1s. 1d. The difference of a penny per foot arises from less of the wood being lost by the action of the saw in cutting a cubic foot into boards or planks each 2 inches thick, than when cut into boards each 1 inch thick. Table XXVIII. is equally applicable to all the five tables—XXIII.-XXVII. The whole six, and more especially XXVI. and XXVIII., have been of very great use to the writer; and, judging by the earnestness with which many a copy in manuscript has been craved of him, they have been of no slight use to others too.

The more valuable kinds of home-grown and foreign timber are usually sold in board and plank at so much per superficial foot. Table XXIX. shows the reciprocal values per cubic and per superficial foot.

TABLE

TABLE XXIX.

Showing the Reciprocal Value of 1 Cubic Foot and 1 Superficial Foot.

Price per cubic foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.
	¼ inch thick.	⅜ inch thick.	½ inch thick.	⅝ inch thick.	¾ inch thick.	⅞ inch thick.	1 inch thick.	1⅛ inch thick.	1¼ inch thick.	1⅜ inch thick.	1½ inch thick.	1⅝ inch thick.
1/	0/0¼	0/0¼·5	0/0½	0/0½·5	0/0¾	0/0¾·5	0/1	0/1 0/4 ·5	0/1¼	0/1¼·5	0/1½	0/1½·5
1/1	0/0¼·083	0/0¼·625	0/0½·166	0/0½·708	0/0¾·250	0/0¾·792	0/1 0/4 ·333	0/1 0/4 ·875	0/1¼·416	0/1¼·958	0/1½·5	0/1¾·042
1/2	0/0¼·166	0/0¼·750	0/0½·333	0/0½·917	0/0¾·5	0/1 0/4 ·083	0/1 0/4 ·666	0/1¼·250	0/1¼·833	0/1½·416	0/1¾	0/1¾·583
1/3	0/0¼·250	0/0¼·875	0/0½·5	0/0¾·125	0/0¾·750	0/1 0/4 ·375	0/1¼	0/1¼·625	0/1½·250	0/1½·875	0/1¾·5	0/2 0/4 ·125
1/4	0/0¼·333	0/0½	0/0½·666	0/0¾·333	0/1	0/1 0/4 ·666	0/1¼·333	0/1½	0/1½·666	0/1¾·333	0/2	0/2 0/4 ·666
1/5	0/0¼·416	0/0½·125	0/0½·833	0/0¾·542	0/1 0/4 ·250	0/1 0/4 ·958	0/1¼·666	0/1½·375	0/1½·083	0/1¾·791	0/2 0/4 ·5	0/2¼·208
1/6	0/0¼·5	0/0½·250	0/0¾	0/0¾·750	0/1 0/4 ·5	0/1¼·250	0/1½	0/1½·750	0/1¾·5	0/2 0/4 ·250	0/2¼	0/2¼·750
1/7	0/0¼·583	0/0½·375	0/0¾·166	0/0¾·958	0/1 0/4 ·750	0/1¼·541	0/1½·333	0/1¾·125	0/1¾·916	0/2 0/4 ·708	0/2¼·5	0/2½·291
1/8	0/0¼·666	0/0½·5	0/0¾·332	0/1 0/4 ·167	0/1¼	0/1¼·833	0/1½·666	0/1¾·5	0/2 0/4 ·333	0/2¼·166	0/2½	0/2½·833
1/9	0/0¼·750	0/0½·625	0/0¾·5	0/1 0/4 ·375	0/1¼·250	0/1½·125	0/1¾	0/1¾·875	0/2 0/4 ·750	0/2¼·625	0/2½·5	0/2¾·375
1/10	0/0¼·833	0/0½·750	0/0¾·666	0/1 0/4 ·583	0/1¼·5	0/1½·416	0/1¾·333	0/2 0/4 ·250	0/2¼·166	0/2½·083	0/2¾	0/2¾·916
1/11	0/0¼·916	0/0½·875	0/0¾·832	0/1 0/4 ·792	0/1¼·750	0/1½·708	0/1¾·666	0/2 0/4 ·625	0/2¼·583	0/2½·541	0/2¾·5	0/3 0/4 ·458
2/	0/0½	0/0¾	0/1	0/1¼	0/1½	0/1¾	0/2	0/2¼	0/2½	0/2¾	0/3	0/3¼
2/1	0/0½·083	0/0¾·125	0/1 0/4 ·166	0/1¼·208	0/1½·250	0/1¾·292	0/2 0/4 ·333	0/2¼·375	0/2½·416	0/2¾·458	0/3 0/4 ·5	0/3¼·542
2/2	0/0½·166	0/0¾·250	0/1 0/4 ·332	0/1¼·417	0/1½·5	0/1¾·583	0/2 0/4 ·666	0/2¼·750	0/2½·833	0/2¾·916	0/3¼	0/3½·083
2/3	0/0½·250	0/0¾·375	0/1 0/4 ·5	0/1¼·625	0/1½·750	0/1¾·875	0/2¼	0/2¼·125	0/2½·250	0/2¾·250	0/3 0/4 ·375	0/3¼·5	0/3½·625
2/4	0/0½·333	0/0¾·5	0/1 0/4 ·666	0/1¼·834	0/1¾	0/2 0/4 ·166	0/2¼·333	0/2¼·5	0/2½·666	0/2¾·666	0/3 0/4 ·833	0/3½	0/3¾·167
2/5	0/0½·416	0/0¾·625	0/1 0/4 ·832	0/1½·042	0/1¾·250	0/2 0/4 ·458	0/2¼·666	0/2½·875	0/3 0/4 ·083	0/3¼·291	0/3½·5	0/3¾·708
2/6	0/0½·5	0/0¾·750	0/1¼	0/1½·250	0/1¾·5	0/2 0/4 ·750	0/2½	0/2½·250	0/3 0/4 ·5	0/3¼·750	0/3¾	0/4 0/4 ·250
2/7	0/0½·583	0/0¾·875	0/1¼·166	0/1½·458	0/1¾·750	0/2¼·042	0/2½·333	0/2¾·625	0/3 0/4 ·916	0/3½·208	0/3¾·5	0/4 0/4 ·791
2/8	0/0½·666	0/1	0/1¼·332	0/1½·666	0/2	0/2¼·333	0/2½·666	0/3	0/3¼·333	0/3½·666	0/4	0/4¼·333
2/9	0/0½·750	0/1 0/4 ·125	0/1¼·5	0/1½·876	0/2 0/4 ·250	0/2¼·625	0/2¾	0/3 0/4 ·375	0/3¼·750	0/3¾·125	0/4 0/4 ·5	0/4¼·875
2/10	0/0½·833	0/1 0/4 ·250	0/1¼·666	0/1¾·083	0/2 0/4 ·5	0/2¼·916	0/2¾·333	0/3 0/4 ·750	0/3½·166	0/3¾·583	0/4¼	0/4½·416
2/11	0/0½·916	0/1 0/4 ·375	0/1¼·832	0/1¾·292	0/2 0/4 ·750	0/2½·208	0/2¾·666	0/3¼·125	0/3½·583	0/4 0/4 ·041	0/4¼·5	0/4½·958
3/	0/0¾	0/1 0/4 ·5	0/1½	0/1¾·5	0/2¼	0/2½·5	0/3	0/3¼·5	0/3¾	0/4 0/4 ·5	0/4½	0/4¾·5

TABLE XXIX.—*Continued.*

Price per cubic foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.
	1¾ inch thick.	1⅞ inch thick.	2 inch thick.	2⅛ inch thick.	2¼ inch thick.	2⅜ inch thick.	2½ inch thick.	2⅝ inch thick.	2¾ inch thick.	2⅞ inch thick.	3 inch thick.	3⅛ inch thick.
1/	0/1¾	0/1¾·5	0/2	0/2⁰/₄·5	0/2¼	0/2¼·5	0/2½	0/2½·5	0/2¾	0/2¾·5	0/3	0/3⁰/₄·5
1/1	0/1¾·583	0/2⁰/₄·125	0/2⁰/₄·666	0/2¼·208	0/2¼·750	0/2½·291	0/2½·833	0/2¾·375	0/2¾·916	0/3⁰/₄·458	0/3¼	0/3¼·541
1/2	0/2⁰/₄·166	0/2⁰/₄·750	0/2¼·333	0/2¼·916	0/2½·5	0/2¾·083	0/2¾·666	0/3⁰/₄·250	0/3⁰/₄·833	0/3¼·416	0/3½	0/3½·582
1/3	0/2⁰/₄·750	0/2¼·375	0/2½	0/2½·625	0/2¾·250	0/2¾·875	0/3⁰/₄·5	0/3¼·125	0/3¼·750	0/3½·375	0/3¾	0/3¾·625
1/4	0/2¼·333	0/2½	0/2½·666	0/2¾·333	0/3	0/3⁰/₄·666	0/3¼·333	0/3½	0/3½·666	0/3¾·333	0/4	0/4⁰/₄·666
1/5	0/2¼·916	0/2½·625	0/2¾·333	0/3⁰/₄·041	0/3⁰/₄·750	0/3¼·458	0/3½·166	0/3½·875	0/3¾·583	0/4⁰/₄·291	0/4¼	0/4¼·707
1/6	0/2½·5	0/2¾·250	0/3	0/3⁰/₄·750	0/3¼·5	0/3½·250	0/3¾	0/3¾·750	0/4⁰/₄·5	0/4¼·250	0/4½	0/4½·750
1/7	0/2¾·083	0/2¾·875	0/3⁰/₄·666	0/3¼·458	0/3½·250	0/3¾·041	0/3¾·833	0/4⁰/₄·625	0/4¼·416	0/4½·208	0/4¾	0/4¾·791
1/8	0/2¾·666	0/3⁰/₄·5	0/3¼·333	0/3½·166	0/3¾	0/3¾·833	0/4⁰/₄·666	0/4¼·5	0/4¼·333	0/4½·166	0/5	0/5⁰/₄·833
1/9	0/3⁰/₄·250	0/3¼·125	0/3½	0/3½·875	0/3¾·750	0/4⁰/₄·625	0/4¼·5	0/4¼·375	0/4½·250	0/5⁰/₄·125	0/5¼	0/5¼·875
1/10	0/3⁰/₄·833	0/3¼·750	0/3½·666	0/3¾·583	0/4⁰/₄·5	0/4¼·416	0/4½·333	0/4½·250	0/5⁰/₄·166	0/5¼·083	0/5½	0/5½·916
1/11	0/3¼·416	0/3½·375	0/3¾·333	0/4⁰/₄·291	0/4¼·250	0/4½·208	0/4¾·166	0/5⁰/₄·125	0/5¼·083	0/5½·041	0/5¾	0/5¾·958
2/	0/3½	0/3¾	0/4	0/4¼	0/4½	0/4¾	0/5	0/5¼	0/5½	0/5¾	0/6	0/6¼
2/1	0/3½·583	0/3¾·625	0/4⁰/₄·666	0/4¼·708	0/4½·750	0/4¾·791	0/5⁰/₄·833	0/5¼·875	0/5½·916	0/5¾·958	0/6¼	0/6½·041
2/2	0/3¾·166	0/4⁰/₄·250	0/4¼·333	0/4½·416	0/4¾·5	0/5⁰/₄·583	0/5¼·666	0/5½·750	0/5¾·833	0/6⁰/₄·916	0/6½	0/6¾·083
2/3	0/3¾·750	0/4⁰/₄·875	0/4½	0/4¾·125	0/5⁰/₄·250	0/5¼·375	0/5½·5	0/5¾·625	0/6⁰/₄·750	0/6¼·875	0/6¾	0/7⁰/₄·125
2/4	0/4⁰/₄·333	0/4¼·5	0/4½·666	0/4¾·833	0/5¼	0/5½·166	0/5¾·333	0/6⁰/₄·5	0/6¼·666	0/6½·833	0/7	0/7¼·166
2/5	0/4⁰/₄·916	0/4½·125	0/4¾·333	0/5⁰/₄·541	0/5¼·750	0/5½·958	0/6⁰/₄·166	0/6¼·375	0/6½·583	0/6¾·791	0/7¼	0/7½·208
2/6	0/4¼·5	0/4½·750	0/5	0/5¼·250	0/5½·5	0/5¾·750	0/6¼	0/6½·250	0/6¾·5	0/7⁰/₄·750	0/7½	0/7¾·250
2/7	0/4½·083	0/4¾·375	0/5⁰/₄·666	0/5¼·958	0/5¾·250	0/6⁰/₄·541	0/6¼·833	0/6¾·125	0/7⁰/₄·416	0/7¼·708	0/7¾	0/8⁰/₄·291
2/8	0/4½·666	0/5	0/5¼·333	0/5½·666	0/6	0/6¼·333	0/6½·666	0/7	0/7¼·333	0/7½·666	0/8	0/8¼·333
2/9	0/4¾·250	0/5⁰/₄·625	0/5½	0/5¾·375	0/6⁰/₄·750	0/6½·125	0/6¾·5	0/7⁰/₄·875	0/7½·250	0/7¾·625	0/8¼	0/8½·375
2/10	0/4¾·833	0/5¼·250	0/5½·666	0/6⁰/₄·083	0/6¼·5	0/6½·916	0/7⁰/₄·333	0/7¼·750	0/7¾·166	0/8⁰/₄·583	0/8½	0/8¾·416
2/11	0/5⁰/₄·416	0/5¼·875	0/5¾·333	0/6⁰/₄·791	0/6½·250	0/6¾·708	0/7¼·166	0/7½·625	0/8⁰/₄·083	0/8¼·541	0/8¾	0/9⁰/₄·458
3/	0/5¼	0/5½·5	0/6	0/6¼·5	0/6¾	0/7⁰/₄·5	0/7½	0/7¾·5	0/8¼	0/8½·5	0/9	0/9¼·5

TABLE XXIX.—*Continued.*

Price per cubic foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.
	¼ inch thick.	⅜ inch thick.	½ inch thick.	⅝ inch thick.	¾ inch thick.	⅞ inch thick.	1 inch thick.	1⅛ inch thick.	1¼ inch thick.	1⅜ inch thick.	1½ inch thick.	1⅝ inch thick.
3/1	0/0¾·083	0/1¾·625	0/1½·166	0/1¾·708	0/2¼·250	0/2½·792	0/3¾·333	0/3¼·875	0/3¾·416	0/4¾·958	0/4½·5	0/5¾·042
3/2	0/0¾·166	0/1¾·750	0/1½·333	0/1¾·917	0/2¼·5	0/2¾·083	0/3¾·666	0/3½·250	0/3¾·833	0/4¼·416	0/4¾	0/5¾·583
3/3	0/0¾·250	0/1¾·875	0/1½·5	0/2¾·125	0/2¼·750	0/2¾·375	0/3¼	0/3½·625	0/4¾·250	0/4¼·875	0/4¾·5	0/5¼·125
3/4	0/0¾·333	0/1¼	0/1½·666	0/2¾·333	0/2½	0/2¾·666	0/3¼·333	0/3¾	0/4¾·666	0/4½·333	0/5	0/5¼·666
3/5	0/0¾·416	0/1¼·125	0/1½·833	0/2¾·542	0/2½·250	0/2¾·958	0/3¼·666	0/3¾·375	0/4¼·083	0/4½·791	0/5¾·5	0/5½·208
3/6	0/0¾·5	0/1¼·250	0/1¾	0/2¾·750	0/2½·5	0/3¾·250	0/3½	0/3¾·750	0/4¼·5	0/4¾·250	0/5¼	0/5½·750
3/7	0/0¾·583	0/1¼·375	0/1¾·166	0/2¾·958	0/2½·750	0/3¾·542	0/3½·333	0/4¾·125	0/4¼·916	0/4¾·708	0/5¼·5	0/5¾·291
3/8	0/0¾·666	0/1¼·5	0/1¾·333	0/2¼·167	0/2¾	0/3¾·833	0/3½·666	0/4¾·5	0/4½·333	0/5¾·166	0/5½	0/5¾·833
3/9	0/0¾·750	0/1¼·625	0/1¾·5	0/2¼·375	0/2¾·250	0/3¼·125	0/3¾	0/4¾·875	0/4½·750	0/5¾·625	0/5½·5	0/6¾·375
3/10	0/0¾·833	0/1¼·750	0/1¾·666	0/2¼·583	0/2¾·5	0/3¼·417	0/3¾·333	0/4¼·250	0/4¾·166	0/5¼·083	0/5¾	0/6¾·916
3/11	0/0¾·916	0/1¼·875	0/1¾·833	0/2¼·792	0/2¾·750	0/3¼·709	0/3¾·666	0/4¼·625	0/4¾·583	0/5¼·541	0/5¾·5	0/6¼·458
4/	0/1	0/1½	0/2	0/2½	0/3	0/3½	0/4	0/4½	0/5	0/5½	0/6	0/6½
4/1	0/1¾·083	0/1½·125	0/2¾·166	0/2½·208	0/3¾·250	0/3½·292	0/4¾·333	0/4½·375	0/5¾·416	0/5½·458	0/6¾·5	0/6½·542
4/2	0/1¾·166	0/1½·250	0/2¾·333	0/2½·417	0/3¾·5	0/3½·583	0/4¾·666	0/4½·750	0/5¾·833	0/5½·916	0/6¼	0/6¾·083
4/3	0/1¾·250	0/1½·375	0/2¾·5	0/2½·625	0/3¾·750	0/3½·875	0/4¼	0/4¾·125	0/5¼·250	0/5¾·375	0/6¼·5	0/6¾·625
4/4	0/1¾·333	0/1½·5	0/2¾·666	0/2½·833	0/3¼	0/3¾·166	0/4¼·333	0/4¾·5	0/5¼·666	0/5¾·833	0/6½	0/7¾·167
4/5	0/1¾·416	0/1½·625	0/2¾·833	0/2¾·042	0/3¼·250	0/3¾·458	0/4¼·666	0/4¾·875	0/5½·083	0/6¾·291	0/6½·5	0/7¾·708
4/6	0/1¾·5	0/1½·750	0/2¼	0/2¾·250	0/3¼·5	0/3¾·750	0/4½	0/5¾·250	0/5½·5	0/6¾·750	0/6¾	0/7¼·250
4/7	0/1¾·583	0/1½·875	0/2¼·166	0/2¾·458	0/3¼·750	0/4¾·042	0/4½·333	0/5¾·625	0/5½·916	0/6¼·208	0/6¾·5	0/7¼·791
4/8	0/1¾·666	0/1¾	0/2¼·333	0/2¾·666	0/3½	0/4¾·333	0/4½·666	0/5¼	0/5¾·333	0/6¼·666	0/7	0/7½·333
4/9	0/1¾·750	0/1¾·125	0/2¼·5	0/2¾·875	0/3½·250	0/4¾·625	0/4¾	0/5¼·375	0/5¾·750	0/6¾·125	0/7¼·5	0/7½·875
4/10	0/1¾·833	0/1¾·250	0/2¼·666	0/3¾·083	0/3½·5	0/4¾·917	0/4¾·333	0/5¼·750	0/6¾·166	0/6½·583	0/7¼	0/7¾·416
4/11	0/1¾·916	0/1¾·325	0/2¼·833	0/3¾·292	0/3½·750	0/4¼·208	0/4¾·666	0/5½·125	0/6¾·583	0/6¾·041	0/7¼·5	0/7¾·958
5/	0/1¼	0/1¾·5	0/2½	0/3¾·5	0/3¾	0/4¼·5	0/5	0/5½·5	0/6¼	0/6¾·5	0/7½	0/8¾·5
5/1	0/1¼·083	0/1¾·625	0/2½·166	0/3¾·708	0/3¾·250	0/4¼·792	0/5¾·333	0/5½·875	0/6¼·416	0/6¾·958	0/7½·5	0/8¼·042

TABLE XXIX.—*Continued.*

Price per cubic foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.	1 superficial foot.
	1¾ inch thick.	1⅞ inch thick.	2 inch thick.	2⅛ inch thick.	2¼ inch thick.	2⅜ inch thick.	2½ inch thick.	2⅝ inch thick.	2¾ inch thick.	2⅞ inch thick.	3 inch thick.	3⅛ inch thick.
3/1	0/5¼·583	0/5¾·125	0/6 0/4·666	0/6½·208	0/6¾·750	0/7¼·292	0/7½·833	0/8 0/4·375	0/8¼·916	0/8¾·458	0/9¼	0/9½·541
3/2	0/5½·166	0/5¾·750	0/6¼·333	0/6½·917	0/7 0/4·5	0/7½·083	0/7¾·666	0/8¼·250	0/8½·833	0/9 0/4·416	0/9½	0/9¾·582
3/3	0/5½·750	0/6 0/4·375	0/6½	0/6¾·625	0/7¼·250	0/7½·875	0/8 0/4·5	0/8½·125	0/8¾·750	0/9¼·375	0/9¾	0/10 0/4·625
3/4	0/5¾·333	0/6¼	0/6½·666	0/7 0/4·333	0/7½	0/7¾·666	0/8¼·333	0/8¾	0/9 0/4·666	0/9½·333	0/10	0/10¼·666
3/5	0/5¾·916	0/6¼·625	0/6¾·333	0/7¼·041	0/7½·750	0/8 0/4·458	0/8½·166	0/8¾·875	0/9¼·583	0/9¾·291	0/10¼	0/10½·707
3/6	0/6 0/4·5	0/6½·250	0/7 0/4	0/7¼·750	0/7¾·5	0/8¼·250	0/8¾	0/9 0/4·750	0/9½·5	0/10 0/4·250	0/10½	0/10¾·750
3/7	0/6¼·083	0/6½·875	0/7 0/4·666	0/7½·458	0/8 0/4·250	0/8½·041	0/8¾·833	0/9¼·625	0/9¾·416	0/10¼·208	0/10¾	0/11 0/4·791
3/8	0/6¼·666	0/6¾·5	0/7¼·333	0/7¾·166	0/8¼	0/8½·833	0/9 0/4·666	0/9½·5	0/10 0/4·333	0/10½·166	0/11	0/11¼·833
3/9	0/6½·250	0/7 0/4·125	0/7½	0/7¾·875	0/8¼·750	0/8¾·625	0/9¼·5	0/9¾·375	0/10¼·250	0/10¾·125	0/11¼	0/11½·875
3/10	0/6½·833	0/7 0/4·750	0/7½·666	0/8 0/4·583	0/8½·5	0/9 0/4·416	0/9½·333	0/10 0/4·250	0/10½·166	0/11 0/4·083	0/11½	0/11¾·916
3/11	0/6¾·416	0/7¼·375	0/7¾·333	0/8¼·291	0/8¾·250	0/9¼·208	0/9¾·166	0/10¼·125	0/10¾·083	0/11¼·041	0/11¾	1/0 0/4·958
4/	0/7	0/7½	0/8	0/8½	0/9	0/9½	0/10	0/10½	0/11	0/11½	1/0	1/0½
4/1	0/7 0/4·583	0/7½·625	0/8 0/4·666	0/8½·708	0/9 0/4·750	0/9½·791	0/10 0/4·833	0/10½·875	0/11 0/4·916	0/11½·958	1/0¼	1/0¾·041
4/2	0/7¼·166	0/7¾·250	0/8¼·333	0/8¾·417	0/9¼·5	0/9¾·583	0/10¼·666	0/10¾·750	0/11¼·833	0/11¾·916	1/0½	1/1 0/4·083
4/3	0/7¼·750	0/7¾·875	0/8½	0/9 0/4·125	0/9½·250	0/10 0/4·375	0/10½·5	0/11 0/4·625	0/11½·750	1/0 0/4·875	1/0¾	1/1¼·125
4/4	0/7½·333	0/8 0/4·5	0/8½·666	0/9 0/4·833	0/9¾	0/10¼·166	0/10¾·333	0/11¼·5	0/11¾·666	1/0¼·833	1/1	1/1½·166
4/5	0/7½·916	0/8¼·125	0/8¾·333	0/9¼·541	0/9¾·750	0/10¼·958	0/11 0/4·166	0/11½·375	1/0 0/4·583	1/0½·791	1/1¼	1/1¾·208
4/6	0/7¾·5	0/8¼·750	0/9 0/4	0/9½·250	0/10 0/4·5	0/10½·750	0/11¼	0/11¾·250	1/0¼·5	1/0¾·750	1/1½	1/2 0/4·250
4/7	0/8 0/4·083	0/8½·375	0/9 0/4·666	0/9½·958	0/10¼·250	0/10¾·541	0/11¼·833	1/0 0/4·125	1/0½·416	1/1 0/4·708	1/1¾	1/2¼·291
4/8	0/8 0/4·666	0/8¾	0/9¼ 333	0/9¾·666	0/10½	0/11 0/4·333	0/11½·666	1/0¼	1/0¾·333	1/1¼·666	1/2	1/2½·333
4/9	0/8¼·250	0/8¾·625	0/9½	0/10 0/4·375	0/10½·750	0/11¼·125	0/11¾·5	1/0¼·875	1/1 0/4·250	1/1½·625	1/2¼	1/2¾·375
4/10	0/8¼·833	0/9 0/4·250	0/9½·666	0/10¼·083	0/10¾·5	0/11¼·916	1/0 0/4·333	1/0½·750	1/1¼·166	1/1¾·583	1/2½	1/3 0/4·416
4/11	0/8½·416	0/9 0/4·875	0/9¾·333	0/10¼·791	0/11 0/4·250	0/11½·708	1/0¼·166	1/0¾·625	1/1½·083	1/2 0/4·541	1/2¾	1/3¼·458
5/	0/8¾	0/9¼·5	0/10	0/10½·5	0/11¼	0/11¾·5	1/0½	1/1 0/4·5	1/1¾	1/2¼·5	1/3	1/3½·5
5/1	0/8¾·583	0/9½·125	0/10 0/4·666	0/10¾·208	0/11¼·750	1/0 0/4·291	1/0½·833	1/1¼·375	1/1¾·916	1/2½·458	1/3¼	1/3¾·541

EXPLANATORY REMARKS ON TABLE XXIX.

Reciprocal values.

In the left-hand column are given prices ranging from 1s. to 5s. 1d. per cubic foot, and in the upper line of figures, commencing "$\frac{1}{4}$ inch thick," is given the thickness of each board or plank, the price per superficial foot of which is given in the column below it. Example: What is the value of a superficial foot yellow pine plank, $1\frac{1}{2}$ inch thick, at 2s. 2d. per cubic foot? Look along the upper line for "$1\frac{1}{2}$ inch thick," and down the left-hand column for 2s. 2d.—at the angle will be found $3\frac{1}{4}$d., being the value of 1 superficial foot $1\frac{1}{2}$-inch plank at 2s. 2d. per cubic foot. The decimals given in the Table are those of a $\frac{1}{4}$d.; thus, $0/0\frac{1}{4}\cdot5$ is a farthing and half-farthing.

Method of realising enhanced prices.

Those who feel disposed to make a little money by their wits sometimes show a considerable degree of ingenuity in devising ways and means of dispensing with an old and generally understood rule of sale for one less understood, and which for a time will give a greater chance of realising enhanced profits. In a part of the country well known to the writer, a log of yellow pine may be bought any day at 2s. per cubic foot; and at the same place, the charge for sawing is 2s. per 100 superficial feet, boards or planks. Yet the usual price for $1\frac{1}{2}$-inch plank of like breadth and quality is $7\frac{1}{2}$d. per superficial foot, being 5s. per cubic foot (*vide* Table XXIX.) At this $7\frac{1}{2}$d. many carpenters buy it, never casting a thought as to the remarkable difference between the two prices. In juxtaposition they stand thus:

100 superficial feet $1\frac{1}{2}$-inch plank, at $7\frac{1}{2}$d. per foot, . .				£3	2 6
Squared timber required for 100 superficial feet $1\frac{1}{2}$-inch plank (Tables XV. and XX.), by a saw cutting out $\frac{3}{32}$ inch at each draught—say $13\frac{1}{3}$ feet, at 2s., . .	£1	6	8		
Sawing 100 superficial feet plank, . . .	0	2	0		
				1	8 8
Difference, ...				£1	13 10

The one method gives the seller the modest profit of 118 per cent over the other, less risk of shakes and waste by slabbing. This risk and waste the 18 per cent alone may be expected in ordinary cases to cover. If the purchaser buys the log at 2s. per cubic foot, and gets it sawn for 2s. per 100 superficial feet, taking the risk of shakes, &c., he will have his $1\frac{1}{2}$-inch plank at 2s. 2d. per cubic foot, being $3\frac{1}{4}$d. per superficial foot, as shown by Table XXIX.

TABLE XXX.

Showing the Reciprocal Value of 1 Square Foot, 1 Square Yard, and 100 Square Feet.

1 square foot, . .	0/$\frac{1}{16}$	0/0$\frac{1}{8}$	0/0$\frac{1}{4}$	0/0$\frac{3}{8}$	0/0$\frac{1}{2}$	0/0$\frac{5}{8}$	0/0$\frac{3}{4}$	0/0$\frac{7}{8}$	0/1	0/1$\frac{1}{8}$	0/1$\frac{1}{4}$	0/1$\frac{3}{8}$
1 square yard, . .	0/$\frac{9}{16}$	0/1$\frac{1}{8}$	0/2$\frac{1}{4}$	0/3$\frac{3}{8}$	0/4$\frac{1}{2}$	0/5$\frac{5}{8}$	0/6$\frac{3}{4}$	0/7$\frac{7}{8}$	0/9	0/10$\frac{1}{8}$	0/11$\frac{1}{4}$	1/0$\frac{3}{8}$
100 square feet, . .	0/6$\frac{1}{4}$	1/0$\frac{1}{2}$	2/1	3/1$\frac{1}{2}$	4/2	5/2$\frac{1}{2}$	6/3	7/3$\frac{1}{2}$	8/4	9/4$\frac{1}{2}$	10/5	11/5$\frac{1}{2}$
1 square foot, . .	0/1$\frac{1}{2}$	0/1$\frac{5}{8}$	0/1$\frac{3}{4}$	0/1$\frac{7}{8}$	0/2	0/2$\frac{1}{8}$	0/2$\frac{1}{4}$	0/2$\frac{3}{8}$	0/2$\frac{1}{2}$	0/2$\frac{5}{8}$	0/2$\frac{3}{4}$	0/2$\frac{7}{8}$
1 square yard, . .	1/1$\frac{1}{2}$	1/2$\frac{5}{8}$	1/3$\frac{3}{4}$	1/4$\frac{7}{8}$	1/6	1/7$\frac{1}{8}$	1/8$\frac{1}{4}$	1/9$\frac{3}{8}$	1/10$\frac{1}{2}$	1/11$\frac{5}{8}$	2/0$\frac{3}{4}$	2/1$\frac{7}{8}$
100 square feet, . .	12/6	13/6$\frac{1}{2}$	14/7	15/7$\frac{1}{2}$	16/8	17/8$\frac{1}{2}$	18/9	19/9$\frac{1}{2}$	20/10	21/10$\frac{1}{2}$	22/11	23/11$\frac{1}{2}$
1 square foot, . .	0/3	0/3$\frac{1}{8}$	0/3$\frac{1}{4}$	0/3$\frac{3}{8}$	0/3$\frac{1}{2}$	0/3$\frac{5}{8}$	0/3$\frac{3}{4}$	0/3$\frac{7}{8}$	0/4	0/4$\frac{1}{8}$	0/4$\frac{1}{4}$	0/4$\frac{3}{8}$
1 square yard, . .	2/3	2/4$\frac{1}{8}$	2/5$\frac{1}{4}$	2/6$\frac{3}{8}$	2/7$\frac{1}{2}$	2/8$\frac{5}{8}$	2/9$\frac{3}{4}$	2/10$\frac{7}{8}$	3/	3/1$\frac{1}{8}$	3/2$\frac{1}{4}$	3/3$\frac{3}{8}$
100 square feet, . .	25/	26/0$\frac{1}{2}$	27/1	28/1$\frac{1}{2}$	29/2	30/2$\frac{1}{2}$	31/3	32/3$\frac{1}{2}$	33/4	34/4$\frac{1}{2}$	35/5	36/5$\frac{1}{2}$
1 square foot, . .	0/4$\frac{1}{2}$	0/4$\frac{5}{8}$	0/4$\frac{3}{4}$	0/4$\frac{7}{8}$	0/5	0/5$\frac{1}{8}$	0/5$\frac{1}{4}$	0/5$\frac{3}{8}$	0/5$\frac{1}{2}$	0/5$\frac{5}{8}$	0/5$\frac{3}{4}$	0/5$\frac{7}{8}$
1 square yard, . .	3/4$\frac{1}{2}$	3/5$\frac{5}{8}$	3/6$\frac{3}{4}$	3/7$\frac{7}{8}$	3/9	3/10$\frac{1}{8}$	3/11$\frac{1}{4}$	4/0$\frac{3}{8}$	4/1$\frac{1}{2}$	4/2$\frac{5}{8}$	4/3$\frac{3}{4}$	4/4$\frac{7}{8}$
100 square feet, . .	37/6	38/6$\frac{1}{2}$	39/7	40/7$\frac{1}{2}$	41/8	42/8$\frac{1}{2}$	43/9	44/9$\frac{1}{2}$	45/10	46/10$\frac{1}{2}$	47/11	48/11$\frac{1}{2}$
1 square foot, . .	0/6	0/7	0/8	0/9	0/10	0/11	1/	2/	3/	4/	5/	6/
1 square yard, . .	4/6	5/3	6/	6/9	7/6	8/3	9/	18/	27/	36/	45/	54/
100 square feet, .	50/	58/4	66/8	75/	83/4	91/8	100/	200/	300/	400/	500/	600/

Reciprocal value of 1 superficial foot, 1 yard, and 100 feet.

When one is accustomed to the sale of wood at so much per 100 superficial feet, there is sometimes some degree of awkwardness felt on being told that a given quantity is to be disposed of at so much per superficial foot or yard. Table XXX. has been constructed with the view of meeting such a case.

This Table may be used by itself, or in combination with others. Thus: A superficial foot of red Dantzic is $\frac{7}{8}$ inch thick, and the price $2\frac{5}{8}$d., what is it worth per square yard? what per 100 superficial feet? and what per cubic foot? Ans. per Table XXX., 1s. $11\frac{5}{8}$d. per square yard, and 21s. $10\frac{1}{2}$d. per 100 square feet; and per Table XXIX. $\frac{7}{8}$ inch at $2\frac{5}{8}$d. $(0/2\frac{1}{2}\cdot5)$ is 3s. per cubic foot.

CHAPTER IX.

PRACTICAL REMARKS AND ILLUSTRATIONS.

THE market value of timber is ever fluctuating, and a price-list suitable for to-day might, six months hence, come to occupy the same shelf with an old almanac. A few years ago fears were entertained as to the supply of timber for shipbuilding purposes, in the event of the outbreak of a Continental war. Out came the iron "Warrior," for the time scattering fear to the winds, and placing timber at a discount. A few years ago the more able railway companies would hear of nothing but larch for railway-sleepers, looking with scorn on Scots fir, and with especial contempt on the softer descriptions of it. The process of creosoting was discovered, and immediately the value of larch was depreciated some 20 to 30 per cent, and the softest Scots fir that could be had was the most highly esteemed. Again, to-day home timber may be a given price, dear as compared with that of foreign growth, and difficult to obtain. To-morrow a hurricane sweeps across the country, levelling trees by millions, as it did in three hours on 3d October 1860: a month hence the market is glutted with home timber, and its price in the round state is down 50 per cent. In such circumstances a person only partially acquainted with the business he professes to follow gets bewildered, like a mariner who, in a storm at sea, having lost compass and reckoning, is tossed and driven he knows not whither, and is wrecked on an unknown coast; while another, by more careful observation and skilful management, makes as straight as may be for a certain harbour, which, if not the one originally desired, he knows is the best for him under the circumstances.

Value of timber fluctuating.

Causes that lead to fluctuations.

Some kinds of trees are found to be more suitable for certain purposes than others. Thus "Norway spruce" of British growth is very generally rejected by house-carpenters in towns; while in the country it is much in request for house-building—viz., for farm-

Different kinds suitable for different purposes.

steadings—being understood to withstand the effects of the vapours arising from cattle better than Scots fir of like age.

As a general rule, Scots fir, larch, and spruce form timber most rapidly between the ages of thirty and sixty years. After this latter age the timber consolidates, and the formation is in a decreasing ratio, and it need not be expected to be really durable till then, more especially the Scots fir. Were consumers to study their own permanent interest, they would see to this; but so great has the rage for "cheap" things become in the present day, that it is quite a common remark with timber-merchants, "Give us sizes, and we care not what your quality may be." No doubt such a course is foolish on the part of consumers, but that is no business of the producer. So long as the demand runs in the present channel, his interest is to bring forward the largest possible bulk of timber from a given extent of land in the least possible time. At present it is a question whether it will pay the producer to allow timber to stand after it has reached the age of sixty or seventy years. It has been proposed to estimate the rate at which a tree has grown in a year, by examination of the number of year's growths in an inch, measuring from centre to exterior; but the author has reason to believe that what forms an inch in ten years now will at a future period occupy very considerably less than that. He is shut up to the conclusion that each year's growth shrinks gradually, year by year, for a considerable period, into less than its original bulk. Did time permit, he is prepared to adduce various ascertained facts confirmatory of the correctness of this opinion. If this opinion of his is correct, then it does not follow, that because a tree has grown 6 inches from centre to exterior in sixty years, and will grow an inch in other ten years, that it will then be found to measure 7 inches.

Quality too little taken into account.

Producer's interest.

Timber shrinks in the living tree.

Larger trees of more value per cubic foot.

Trees of small size are less valuable *per cubic foot* than those of larger size. This arises from their being less difficult to procure, less productive of useful timber, more expensive to manufacture, and more expensive to work up. In Strathspey a rule was, and perhaps still is, in use, and appears a sound one. Trees containing under 10 cubic feet were charged 8d. per foot; upwards of 10 feet, but under 20 feet, 9d. per foot; upwards of 20 feet, 10d. per foot. Large, tall, straight-grown trees turn out a greater quantity of useful timber than one unaccustomed to them would be apt to suppose from merely seeing them standing in the plantation. Very little more than the sawdust goes to waste if they taper slowly towards the point.

As smaller trees are less valuable than larger ones, so the smaller

part of each tree is less valuable than the thicker part, other things being equal. Flooring-boards inch thick answer the purpose sufficiently although narrow and even knotty, provided the knots are not loose, and, consequently, are frequently sold at the same price per 100 superficial feet as ¾-inch boards from the better part of the same tree. Thus, suppose 100 feet ¾-inch boards are sold for 11s. 11d. (Table XXVI.), 100 feet inch flooring from the point of the tree, in place of being charged 15s. 2d., may be sold at 11s. 11d. One part of a tree more valuable than another.

Standing trees often are not what they seem to be. They may appear quite healthy outside, and, when felled, the central part be found shaken, dried, or decayed, thereby occasioning the loss of the most valuable portion of the timber. One cannot well tell how far up the blemish may extend, and, in expectation that it will be cut off, may cut the tree across, and, after all, require to cut again, the value of the wood lessening all the while in proportion to the shortness of the sections. Loss by decayed heart.

Another great evil arises from pruning firs. There is under the author's charge a plantation of what might have been very valuable Scots fir, the age of which ranges from 80 to 100 years. Many of the trees look clean and free from blemish till taken to the saw. On being cut up, they are found to have been pruned, and the result of the operation is, that the roots or stumps of the branches left have died in to the very centre of the tree; and when it is cut into boards, these decayed stumps drop out in the shape of round loose knots. There are a few of them that have not so died, but they form the exception to the general rule. The loss by this means, in this particular case, is certainly not under 30 per cent. Scots firs ought never to be pruned by artificial means; nature manages the operation in a manner that man can but poorly imitate. The very nature of the fir points it out as a tree to be grown in masses. Growing alone, it is a crooked, scraggy, useless thing; grown in the forest, it is a fine, tall, straight tree. In its proper position, it shoots up till it attain nearly to its full height; the leading branches then almost cease growing, but retain their vitality in order that the trunk may continue to form timber, and that first formed may be fully matured by undergoing a natural process of embalming. When that is finished, then is the time to cut it for man's use. So with the lower branches in a plantation of firs standing at proper distances apart; they grow till the principal end for which they were created is attained, then cease, and, if left alone, their roots get embalmed and rendered durable as the trunk itself, after which they drop off of their own accord. But, Bad results arising from pruning fir.

Natural process of pruning fir illustrated.

pruned by the hand of man while in an active growing state, they are generally irreparably injured—in fact, are very much in the position of a fowl which should have its feathers plucked off in early spring, in place of being let alone till autumn, when they would drop off naturally, and without inflicting injury.

Of squared timber.

The loss arising from crooked, and from rapidly-tapering trees has already been pointed out in so far by means of diagrams, with remarks, but an additional observation may be of use. In rural districts, a common form of rafter is 12 to 13 feet long, 2½ inches thick, 6 inches broad at base, and 5 inches at top. When a pair of such rafters are cut from a suitable tree, the solid content of the squared wood is about the same as the solid content of the round timber,—the extra wood given by the ordinary method of measuring round timber (Rule I.), amounting to as much additional as makes up for the waste by slabs and sawdust. Again, if a log is sawn into boards, it was shown by means of Table XXI. that the solid content of the boards is equal to the solid content of the round timber *less the sawdust*. This

Loss by long beams.

holds good up to about 12 feet long, but unless the trees are all the more straight grown, after passing that length there is an additional loss by every additional foot of length. Thus, if a beam of home timber is required, the solid content of which shall be 12 feet, and its length 25 to 30 feet, it is highly probable that a section of a tree containing 18 cubic feet of round timber will be necessary to produce it. The 6 feet contained in the slabs will be of some use no doubt, but will be found in pieces so irregular in form that the greater part of the charge falls to be laid on the main beam. Suppose the 18 feet to be worth 18s., then the charge may be apportioned thus:—

	s.	d.
Beam containing 12 feet, at 1s. 2½d. per foot, . .	14	6
Smaller pieces, containing 4 feet, at 10½d. per foot, .	3	6
Wasted, 2 feet, ...	0	0
Amount for 16 feet available timber, .	18	0

Percentage to cover incidental expenses.

At longer or shorter intervals, according to his exigencies, a grocer or draper visits the centres of manufacture for the purpose of selecting and purchasing such goods as he requires. Knowing that he can obtain an additional supply at any time, he takes only what is likely to serve his purpose for a limited period. When once home and safely housed, he knows that if "fashion" let him alone, his wares will likely diminish little in value for a considerable time. Standing behind the counter, he can wait comfortably for his customers. These,

in all likelihood, are from the "surrounding district," and at no great expenditure of time he may be able to form a shrewd guess to what extent he may safely sell to any one of them on credit. In fixing his prices, he does not consider 10 per cent above his own purchase-price an exorbitant charge. The timber-merchant must have his percentage too, but it requires to be on a more liberal scale. The object of his attention is not manufactured to order, like a yard of calico. He has to search for it, it may be for weeks or months; and when obtained, he has to travel many a mile, and expend many a shilling, in order to find a market for his goods; and the field of his operations may be as wide as that of a hundred grocers or drapers, consequently his risk of bad payments is greatly increased. If the cloth of the draper is liable to damage on the shelf, the round trees of the timber-merchant in the plantation are liable to death, and his manufactured timber to spoiling in the rack by lengthened exposure to the weather. If the soft goods of the one are liable to damage by fire, the standing trees of the other are liable to destruction by a gale of wind, without a chance of compensation by an insurance company. Taking time, capital, and all these other circumstances into account, 15 to 20 per cent upon the purchase-price of the rough timber, with expense of manufacture added, may not be too much.

Expenses attending marketing.

Whether the grower should be the manufacturer of his own timber, is a matter which depends very much on circumstances. A certain amount of experience and skill must be brought into play to enable one to do so profitably. If the quantity of timber that can be disposed of is small, it may not be worth the trouble and expense to find qualified men, &c., to cut it up for behoof of the grower. In that case the most advantageous method is to sell it in the round state to those who have at hand the proper appliances to bear on it, and who make it their business to manufacture and dispose of it to the consumer. On the other hand, where the quantity is large, and the supply in great measure permanent, there is no valid reason why the grower should not realise the most that may be realised from his own property. It cannot be expected that any timber-merchant will make a purchase, and devote his time and capital to it, without a prospect of at least an adequate profit. The grower possesses many advantages over the timber-merchant. Workmen are prepared to work to the former at a more moderate rate of wages, because they have no fear as to the payment of what is promised; and every provident man knows something of the value of steady employment and steady wages, and will strain every nerve to deserve and retain them. There is a wide

Should the grower manufacture his timber?

The grower's advantages.

Advantages of steady employment.

difference between steady wages at a moderate rate per day, and underpayment. None but a lazy fellow who prefers a dog's life would accept the latter. But when it is stated, as was done the other day by a trustworthy mason, that although he earned from 4s. to 4s. 6d. a-day while at work, yet his gross earnings in any one year never exceeded £40, owing to broken time by bad weather and going between jobs, the value of steady earnings by steady work will be perceived. Growers of timber usually have it in their power to accommodate their workpeople with cottages for their families, and this of itself is no slight boon to a working man. Do not suppose that every workman will cheat you of your time when your back is turned. No; depraved as our human nature is, there are as honest, noble hearts beating below the canvass jacket of the saw-miller and wood-cutter as ever beat beneath cloth of any other quality, cut, or colour—the hearts of men who know that they have to give an account of their actions at a higher tribunal than that of any man. Let the employer tolerate no man of loose habits, give fair wages, and we fear not the result of employment by the day, as compared with any system whatever.

Disadvantages of the timber-merchant.

A timber-merchant is usually taken bound to have his purchase removed within a given time, and is thus frequently compelled to seek, not the dearest, but the readiest market, and to cut up his trees for one purpose, when, with a little more time, they would have brought a far higher return for another. The producer is not necessarily limited to time in his operations, and thus, from fear of exceeding a certain period, led to smash up his wood to take the readiest market. Another matter, in itself worth a large percentage, is, that the producer can send to the plantations, and select every tree he cuts with a special object in view. Take the case of railway fencing: a stick of a certain size will produce as many bars as another 20 per cent larger. So in a greater or less degree with other things. By many of the more able class of buyers the position of the grower is taken as a sort of guarantee that their agreements will be honourably implemented, and on this account they do not hesitate to give a higher price than they would to another of whose position they felt less certain. The writer has repeatedly attempted to dispose of timber in quantity in the unmanufactured state, but has never been able to do so at a price approaching to the equivalent of what he could realise by direct sale to the consumer of the manufactured article. In view of the above-stated facts, the reasons are not far to seek.

The author's experience.

CHAPTER X.

EXAMPLES OF PRACTICAL APPLICATION.

We now proceed to give a few illustrations of the practical application of the elementary facts contained in this work.

1. An heritor has a quantity of Scots fir to dispose of; the age is sixty years, and the mean average girth 36 inches. He finds that boards, each $\frac{3}{4}$ inch thick, from like timber, are being generally disposed of in his own neighbourhood at 12s. per 100 superficial feet. What is the value of his rough wood under the following circumstances? The most economical method of manufacture he can find is— What is the value of round timber to the grower?

A. B. to fell and cross-cut it into proper lengths at $\frac{1}{4}$d. per cubic foot.
C. D. to cart it to a saw-mill at 4s. per ton, bringing the produce back as a return-load free.
E. F. to saw it by a saw cutting out $\frac{1}{8}$ inch at each draught, at 1s. per 100 superficial feet saw-measure.

In order to bring out the answer, turn to Table XV., and it is found under "$\frac{1}{8}$ inch" that 1 foot and 6 parts is wasted by sawdust; and turn to Table XX., and it is found that 100 superficial feet $\frac{3}{4}$-inch boards are $6\frac{1}{4}$ solid feet, thus showing that $7\frac{1}{4}$ cubic feet round timber are required to produce 100 superficial feet $\frac{3}{4}$-inch boards. If, as is customary with home timber, a little additional thickness is given to each board, then $7\frac{1}{2}$ feet may be required. Turn to Table XI., and to page 34, and it will be observed that Scots fir of the age specified will probably weigh 84 lb. per cubic foot rough timber. Turn to Table XIII., and it will be observed that there are 4 superficial feet slabbing in a cubic foot of timber; the mean circumference of the log being 36 inches ("side of square being 9 inches"). Then— How to find the answer.

	s.	d.	
Felling, and cross-cutting $7\frac{1}{2}$ cubic feet, at $\frac{1}{4}$d. say,	0	$1\frac{3}{4}$	
Carting $7\frac{1}{2}$ feet (630 lb.) at 4s. per ton, . . .	1	$1\frac{1}{2}$	
Slabbing 30 superficial feet, and sawing 100 feet = 130 feet, at 1s., ...	1	$3\frac{1}{2}$	
Amount of expense, ...	2	$6\frac{3}{4}$	on $7\frac{1}{2}$ feet.

	s.	d.
Selling price of 100 superficial feet $\frac{3}{4}$-inch boards,	12	0
Expenses as above, ...	2	$6\frac{3}{4}$
Leaving value of $7\frac{1}{2}$ cubic feet round timber,	9	$5\frac{1}{4}$

being about 1s. 3d. per foot, less incidental expenses.

2. If cut up on the spot by men with the arm-saw, cutting out $\frac{2}{32}$ inch at each draught, at 2s. 5d. per 100 feet, sale-measure, what will the round timber be worth per cubic foot?

	ft.	in.	pts.
Vide Table XV. Waste by saw, . . .	0	9	$4\frac{1}{2}$
„ Table XX. Solid content of 100 feet $\frac{3}{4}$-inch boards, ...	6	3	0
Allowance for additional thickness, . .	0	2	$7\frac{1}{2}$
Required for 100 feet boards, . .	7	3	0

Then—

	s.	d.	
Felling $7\frac{1}{4}$ cubic feet round timber, at $\frac{1}{4}$d. per foot—say	0	$1\frac{3}{4}$	
Sawing, at 2s. 5d., ...	2	5	
Amount of expense, ...	2	$6\frac{3}{4}$	on $7\frac{1}{4}$ feet.

	s.	d.
Selling price of 100 superficial feet $\frac{3}{4}$-inch boards,	12	0
Expenses as above, ...	2	$6\frac{3}{4}$
Leaving value of $7\frac{1}{4}$ cubic feet round timber,	9	$5\frac{1}{4}$

being 1s. $3\frac{1}{2}$d. per foot, less incidental expenses.

Advantages of manufacturing on the spot.

Note.—It is thus shown to be more advantageous for the owner of round timber to cut it up on the spot by the arm-saw, at 2s. 5d. per 100 feet, sale-measure, than to pay carriage at 4s. per ton, and have it done by a mill cutting out only $\frac{1}{32}$ inch more at each draught, and at 1s. $3\frac{1}{2}$d. per 100 feet, sale-measure. Had the log ($7\frac{1}{2}$ feet) been simply slabbed, the difference in favour of the arm-saw would have been still greater, viz. $8\frac{3}{4}$d., as against carriage 1s. $1\frac{1}{2}$d., and

sawing 3½d.—in all, 1s. 5d. If sawn into boards thicker than ¾ inch, the difference would have been proportionally greater in favour of the arm-saw. If sawn into thinner than ¾ inch, it would have been proportionally less.

Carriage of round timber and dry produce in boards.

3. If the carriage of the 7½-feet round timber (Question 1) would have cost 1s. 1½d. at 4s. per ton, what would the carriage of the produce in dry ¾-inch boards cost at the same rate, supposing their solid content to be 6½ feet?

Vide Table XI., and page 35, Weight of a foot dry boards, 30 lb.

Then—

30 × 7½ = 225 lb., at 4s. per ton = 4¾d. for the dry boards, as against 1s. 1½d. for the rough timber.

Larch in round state and sawn into boards.

4. An heritor is offered 1s. 2d. per cubic foot for round larch, or 13s. per 100 superficial feet for it in dry boatskin ⅞ inch thick; in either case to be delivered free to the purchaser on waggon at a railway station, 2½ miles distant from the plantation. A. and B. offer to saw it, by a saw cutting out $\frac{3}{3\frac{1}{2}}$ inch, at 3s. 3d. per 100 superficial feet, sale-measure. C. D. offers to cart it to the station and load it on waggon, manufactured or unmanufactured, at 2s. per ton. Which will be the more advantageous for the seller?

Manufactured.

	s.	d.	s.	d.
Vide Tables XV. and XX. for what is required for 100 feet ⅞ inch. Price at station, . . .			13	0
Deduct for sawing, ...	3	3		
Deduct for carriage of 7¼ cubic feet dry boards, 32 lb. per foot (Table XI. and page 35), at 2s. per ton, . . .	0	2½		
			3	5½
Leaving value of 8 feet round timber,			9	6½

Unmanufactured.

	s.	d.	s.	d.
Value of 8 feet round timber at station, at 1s. 2d. per cubic foot, . .	9	4		
Deduct for carriage of 8 feet, 32 feet to a ton (Table XI. and page 34), at 2s. per ton, ...	0	6		
Leaving value of 8 feet round timber,	8	10		
			8	10
Difference in favour of selling it manufactured,			0	8½ per 100 ft.,

being 1$\frac{1}{16}$d. per cubic foot.

Value of round timber given, what is it worth in boards?

5. A timber-merchant has purchased a plantation of Scots fir at 8d. per cubic foot, and finds that he can manufacture it by means of a portable steam-engine and circular saws, and that the mean average expense will be—Felling, $\frac{1}{4}$d. per foot; carrying to mill, 1d. per foot; sawing, 6d. per 100 superficial feet, saw-measure; carrying manufactured timber to market, 5s. per ton; interest of capital invested, time, risk, &c., 20 per cent. What can he afford to sell 100 feet $\frac{3}{4}$-inch boards for from trees 48 inches circumference, when his saws cut out $\frac{5}{32}$ inch, and $\frac{1}{32}$ inch additional thickness is allowed to each board?

Table XXVII. shows that 7 feet $9\frac{3}{4}$ inches are required for these 100 feet $\frac{3}{4}$-inch boards; then—

Purchase price of 7 feet $9\frac{3}{4}$ inches, at 8d. per foot, . .				£0	5	2
Felling price of 7 feet $9\frac{3}{4}$ inches, at $\frac{1}{4}$d. per foot,	£0	0	2			
Carrying to mill, at 1d., ...	0	0	$7\frac{3}{4}$			
Slabbing (per Table XXII.) $23\frac{1}{2}$ feet, and sawing 100 feet boards, at 6d. per 100 feet, . .	0	0	$7\frac{1}{2}$			
Carrying the $6\frac{1}{2}$ cubic feet dry boards to market (32 lb. per cubic foot, per Table XI. and page 35), at 5s. per ton, ...	0	0	$5\frac{1}{2}$			
				0	1	$10\frac{3}{4}$
				£0	7	$0\frac{3}{4}$
Add interest of capital, &c., at 20 per cent, . . .				0	1	5
Selling price of 100 superficial feet $\frac{3}{4}$-inch boards,				£0	8	$5\frac{3}{4}$

Relative value.

6. If 100 superficial feet $\frac{3}{4}$-inch boards are worth 8s. $5\frac{1}{2}$d. (waste by saw and additional thickness being $\frac{3}{16}$ inch), what are 100 feet inch boards worth at the same rate? Ans. (Table XXVII.), 10s. $8\frac{1}{2}$d.; and what are $\frac{1}{2}$-inch boards worth? Ans., 6s. $2\frac{1}{4}$d.

7. If 100 superficial feet inch boards are worth 9s. $0\frac{3}{4}$d., what are they worth per cubic foot in the sawn state? To find the answer, turn to Table XXVIII., and look down the left-hand column till 1 inch is found; then along that line till the sum nearest 9s. $0\frac{3}{4}$d. is found (in this case 9s. $0\frac{1}{2}$d.); and at the *top* of that column, 13d. per cubic foot is shown to be the answer.

8. If 100 superficial feet inch boards are worth 9s. $0\frac{3}{4}$d. (Table XXVII.), what is the value of a cubic foot of plank 2 inches thick? In order to find the answer, look down the column from 9s. $0\frac{3}{4}$d. till opposite 2 inches in the left-hand column, where it will be observed that 100 superficial feet 2-inch plank are worth 16s. $8\frac{1}{2}$d.; then turn

to Table XXVIII., and find 2 inches in the left-hand column; let the eye run along that line towards the right till the sum nearest 16s. 8½d. is found (in this case it is 16s. 8d.); and at the top of the column stands 12d., which shows that a cubic foot of 2-inch plank is worth about 1s., when 100 superficial feet boards, each an inch thick, are worth 9s. 0¾d.

Note.—The author is very desirous that the reader should continue practising such exercises as these till the mind gets familiar with the method pursued. The advantages to be gained by the latter will amply repay his trouble, as it will enable him at a moment's warning to fix the relative value of any thickness of boards or planks, at any rate per 100 superficial feet, or per cubic foot. Many parties have their prices extremely ill proportioned; and if he is buying he can take the cheapest way of calculation; and if selling he can take the dearest, if there is a difference.

Attention to these exercises very necessary.

Table XXVIII. is equally applicable to any one of Tables XXIII.–XXVII.

If Table XXVIII. is used by itself, the sums given in it are absolute, not relative. Thus, 100 superficial feet boards, each 1 inch thick, at 8s. 4d., are at the rate of 1s. per cubic foot; and 100 superficial feet boards or planks, each 2 inches thick, at 16s. 8d., are at the rate of 1s. per cubic foot; but these are not proportionate prices, because the saw destroys much more in cutting a cubic foot into 1-inch than into 2-inch boards. Their relative value is 1s. per cubic foot for the 2 inches thick, and 1s. 1d. per cubic foot for the 1 inch thick, as may be observed from the Tables.

9. If whitewood flooring boards, 1 inch thick, are worth 1¾d. per superficial foot, what are they worth per 100 superficial feet? To find the answer, turn to Table XXX., and below 1¾d. is 14s. 7d.

10. If whitewood flooring 1 inch thick is worth 1¾d. per superficial foot, what is it worth per cubic foot? To find the answer, turn to Table XXIX., look along the uppermost line of figures till "1 inch thick" is reached, then down the column till 1¾d. is reached, then turning towards the left, to the left-hand column, it is found that the answer is 1s. 9d. per cubic foot.

11. A carpenter has 50 cubic feet of oak at his saw-pit for 3s. per foot in the hewn log. A. and B. offer to saw it by a saw which, with the additional thickness given, will require ⅛ inch at each draught,

Expense per cubic foot in sawing oak, &c., into plank.

and to do so at the rate of 3s. per 100 superficial feet sale-measure: What will the sawing of it into $1\frac{3}{8}$-inch plank cost him? In order to find the answer, turn to Table XIV. Let the eye run along the upper line of figures till it reaches $1\frac{3}{8}$ in., and down the left-hand column till it reaches $\frac{1}{8}$ in.; at the angle 8 ft. will be found, showing there are 8 feet sawing in cutting a cubic foot into $1\frac{3}{8}$-inch plank. Then 8 feet × 50 feet = 400 feet sawing, which, at 3s. per 100, gives 12s. as the cost of sawing the 50 cubic feet of oak into the required thickness.

Loss of timber in sawing the oak.

12. What is the solid content of the wood lost by the carpenter as above? To find the answer, turn to Table XV., and it will be observed that under $\frac{1}{8}$ inch is set down a loss of 1 foot $\frac{1}{2}$ inch in sawing 100 superficial feet. Then 1 foot $\frac{1}{2}$ inch (1 ft. 0 in. 6 pt.) × 4 (400 feet) = 4 feet 2 inches loss. By Table XVI. it will be observed that every twelfth foot is lost.

Value per cubic foot and per superficial foot.

13. The carpenter having paid £7, 10s. for his oak log, 12s. for sawing it, and lost 4 feet 2 inches in the operation, his 45 feet 10 inches stands him about 3s. $6\frac{1}{4}$d. per cubic foot in $1\frac{3}{8}$-inch plank: What can he afford to sell this plank at per superficial foot? In order to find the answer, turn to Table XXIX., find "$1\frac{3}{8}$ in. thick" at the top, and 3s. 6d. in the left-hand column; at the angle is $4\frac{3}{4}$·250, showing that the value per superficial foot is a little over $4\frac{3}{4}$d.

Payment of sawyers.

14. A pair of sawyers engage to saw timber in any quantity at 2s. per 100 superficial feet saw-measure. They are set to cut up a parcel of logs, the mean average girth of which is 36 inches, giving 9 inches as the side of the square. They find that their saw-draught, with additional thickness given to each board, amounts to $\frac{1}{8}$ inch: What should they be paid per 100 feet sale-measure for boards $\frac{5}{8}$ inch, $\frac{7}{8}$ inch, and $1\frac{1}{8}$ inch thick respectively? It is shown by Table XXV. that there are required for 100 feet $\frac{5}{8}$ inch, $6\frac{1}{4}$ cubic feet round timber; for 100 feet $\frac{7}{8}$ inch, $8\frac{1}{3}$ feet; and for $1\frac{1}{8}$ inch, $10\frac{5}{12}$ feet; and it is shown by Table XIII. that logs having the side of the square 9 inches require 4 feet slabbing per cubic foot. The cost of sawing, therefore, stands thus:—

100 feet $\frac{5}{8}$ require $6\frac{1}{4}$ feet, which require 25 feet slabbing, added to 100 feet sawing = 125 feet at 2s. = 2s. 6d.

100 feet $\frac{7}{8}$ require $8\frac{1}{3}$ feet, which require 33 feet slabbing, added to 100 feet sawing = 133 feet at 2s. = 2s. 8d.

100 feet $1\frac{1}{8}$ require $10\frac{5}{12}$ feet, which require 42 feet slabbing, added to 100 feet sawing = 142 feet at 2s. = 2s. 10d.

Examples might be multiplied indefinitely; but it is hoped that to

the attentive reader those now given will be found sufficient to illustrate the scope and uses of this work as a whole. Each Table is of use by itself; and in an infinite number of cases two or more combine to bring out certain facts which must be known before any one can be at all master of the subject.

SOLID, AND SUPERFICIAL MEASURE.

'Stoddart's Tables.'

For the purpose of calculating the solid content of timber of any given dimensions, there is no work which will stand comparison for a single minute with that by Richard Stoddart, O. M., Leith, and entitled 'Tables for Computing the Solid Content of Timber.' The edition in the hands of the present writer bears date 1818.

Superiority of common 'Ready Reckoner' for flat measure.

For calculating the superficial area of boards, there is nothing better to be desired than a Ready Reckoner, treating of pounds, shillings, and pence. All that is necessary in using it is to bear this simple rule in mind—viz., in calculating superficial area of boards, for *Pence* read *Inches*, and for *Shillings* read *Feet*. Only a few examples need be given.

1. How many superficial feet are there in 50 lineal feet slate lath $1\frac{3}{4}$ inches broad? To find the answer, turn up the page headed $1\frac{3}{4}$d., and opposite 50 will be found 7s. $3\frac{1}{2}$d., which read 7 feet $3\frac{1}{2}$ inches, as above.

2. How many superficial feet in 48 lineal feet skirting $4\frac{3}{4}$ inches broad? Turn up the page headed $4\frac{3}{4}$d., and opposite 48 will be found 19s., which read 19 feet.

3. Pounds require to be reduced to shillings—thus: How many superficial feet in 100 lineal feet 3 inches broad? Turn up the page headed 3d., and opposite 100 will be found £1, 5s., which read 25 shillings or 25 feet.

4. An upright paling for a garden requires 1000 lineal feet of rail $2\frac{1}{2}$ inches broad, $\frac{1}{2}$ inch thick: How many superficial feet of $\frac{1}{2}$ inch does it require? Turn up the page headed $2\frac{1}{2}$d., and opposite 1000 will be found £10, 8s. 4d., which being 208 shillings and 4 pence, shows that there are $208\frac{1}{3}$ superficial feet $\frac{1}{2}$-inch boards required for the 1000 lineal feet rail.

The value of a given number of feet, at so much per 100 feet, is

Value of a given number of feet.

most easily found by decimals—thus: What is the expense of sawing 70 feet, at 2s. 3d. per 100 feet? Multiply 70 (feet) by 27 (2s. 3d.), and the answer is 18·90d., or 1s. $6\frac{9}{10}$d.

Numbers of men who never paid any attention to decimals are good sawyers and saw-millers; but half-an-hour, with the assistance of one who does understand them, will be sufficient to make them quite plain. As a mere matter of convenience, Table XXXI. is given.

As a matter of further convenience, Table XXXII., as a wages calculator, has been constructed. In summer, the day's work, out-doors, is usually 10 hours; in autumn and spring 9 hours; and in winter 8 hours. A rate per hour for days of all these lengths is given.

TABLE XXXI.

VALUE of SAWING, or of BOARDS, per 100 Feet.

(0/3 to 2/6)

100 at 3d.		At 6d.	At 9d.	At 1/0	At 1/3	At 1/6	At 1/9	At 2/0	At 2/3	At 2/6
ft.										
1	0/0·03	0/0·06	0/0·09	0/0·12	0/0·15	0/0·18	0/0·21	0/0·24	0/0·27	0/0·30
2	0/0·06	0/0·12	0/0·18	0/0·24	0/0·30	0/0·36	0/0·42	0/0·48	0/0·54	0/0·60
3	0/0·09	0/0·18	0/0·27	0/0·36	0/0·45	0/0·54	0/0·63	0/0·72	0/0·81	0/0·90
4	0/0·12	0/0·24	0/0·36	0/0·48	0/0·60	0/0·72	0/0·84	0/0·96	0/1·08	0/1·20
5	0/0·15	0/0·30	0/0·45	0/0·60	0/0·75	0/0·90	0/1·05	0/1·20	0/1·35	0/1·50
6	0/0·18	0/0·36	0/0·54	0/0·72	0/0·90	0/1·08	0/1·26	0/1·44	0/1·62	0/1·80
7	0/0·21	0/0·42	0/0·63	0/0·84	0/1·05	0/1·26	0/1·47	0/1·68	0/1·89	0/2·10
8	0/0·24	0/0·48	0/0·72	0/0·96	0/1·20	0/1·44	0/1·68	0/1·92	0/2·16	0/2·40
9	0/0·27	0/0·54	0/0·81	0/1·08	0/1·35	0/1·62	0/1·89	0/2·16	0/2·43	0/2·70
10	0/0·30	0/0·60	0/0·90	0/1·20	0/1·50	0/1·80	0/2·10	0/2·40	0/2·70	0/3·
11	0/0·33	0/0·66	0/0·99	0/1·32	0/1·65	0/1·98	0/2·31	0/2·64	0/2·97	0/3·30
12	0/0·36	0/0·72	0/1·08	0/1·44	0/1·80	0/2·16	0/2·52	0/2·88	0/3·24	0/3·60
13	0/0·39	0/0·78	0/1·17	0/1·56	0/1·95	0/2·34	0/2·73	0/3·12	0/3·51	0/3·90
14	0/0·42	0/0·84	0/1·26	0/1·68	0/2·10	0/2·52	0/2·94	0/3·36	0/3·78	0/4·20
15	0/0·45	0/0·90	0/1·35	0/1·80	0/2·25	0/2·70	0/3·15	0/3·60	0/4·05	0/4·50
16	0/0·48	0/0·96	0/1·44	0/1·92	0/2·40	0/2·88	0/3·36	0/3·84	0/4·32	0/4·80
17	0/0·51	0/1·02	0/1·53	0/2·04	0/2·55	0/3·06	0/3·57	0/4·08	0/4·59	0/5·10
18	0/0·54	0/1·08	0/1·62	0/2·16	0/2·70	0/3·24	0/3·78	0/4·32	0/4·86	0/5·40
19	0/0·57	0/1·14	0/1·71	0/2·28	0/2·85	0/3·42	0/3·99	0/4·56	0/5·13	0/5·70
20	0/0·60	0/1·20	0/1·80	0/2·40	0/3·	0/3·60	0/4·20	0/4·80	0/5·40	0/6·
25	0/0·75	0/1·50	0/2·25	0/3·	0/3·75	0/4·50	0/5·25	0/6·	0/6·75	0/7·50
30	0/0·90	0/1·80	0/2·70	0/3·60	0/4·50	0/5·40	0/6·30	0/7·20	0/8·10	0/9·
35	0/1·05	0/2·10	0/3·15	0/4·20	0/5·25	0/6·30	0/7·35	0/8·40	0/9·45	0/10·50
40	0/1·20	0/2·40	0/3·60	0/4·80	0/6·	0/7·20	0/8·40	0/9·60	0/10·80	1/0·
45	0/1·35	0/2·70	0/4·05	0/5·40	0/6·75	0/8·10	0/9·45	0/10·80	1/0·15	1/1·50
50	0/1·50	0/3·	0/4·50	0/6·	0/7·50	0/9·	0/10·50	1/0·	1/1·50	1/3·
55	0/1·65	0/3·30	0/4·95	0/6·60	0/8·25	0/9·90	0/11·55	1/1·20	1/2·85	1/4·50
60	0/1·80	0/3·60	0/5·40	0/7·20	0/9·	0/10·80	1/0·60	1/2·40	1/4·20	1/6·
65	0/1·95	0/3·90	0/5·85	0/7·80	0/9·75	0/11·70	1/1·65	1/3·60	1/5·55	1/7·50
70	0/2·10	0/4·20	0/6·30	0/8·40	0/10·50	1/0·60	1/2·70	1/4·80	1/6·90	1/9·
75	0/2·25	0/4·50	0/6·75	0/9·	0/11·25	1/1·50	1/3·75	1/6·	1/8·25	1/10·50
80	0/2·40	0/4·80	0/7·20	0/9·60	1/0·	1/2·40	1/4·80	1/7·20	1/9·60	2/0·
85	0/2·55	0/5·10	0/7·65	0/10·20	1/0·75	1/3·30	1/5·85	1/8·40	1/10·95	2/1·50
90	0/2·70	0/5·40	0/8·10	0/10·80	1/1·50	1/4·20	1/6·90	1/9·60	2/0·30	2/3·
95	0/2·85	0/5·70	0/8·55	0/11·40	1/2·25	1/5·10	1/7·95	1/10·80	2/1·65	2/4·50
100	0/3·	0/6·	0/9·	1/0·	1/3·	1/6·	1/9·	2/0·	2/3·	2/6·

TABLE XXXI.—*Continued.*

VALUE of SAWING, or of BOARDS, per 100 Feet.

(2/9 to 5/0)

100 at 2/9		At 3/0	At 3/3	At 3/6	At 3/9	At 4/0	At 4/3	At 4/6	At 4/9	At 5/0
ft.										
1	0/0·33	0/0·36	0/0·39	0/0·42	0/0·45	0/0·48	0/0·51	0/0·54	0/0·57	0/0·60
2	0/0·66	0/0·72	0/0·78	0/0·84	0/0·90	0/0·96	0/1·02	0/1·08	0/1·14	0/1·20
3	0/0·99	0/1·08	0/1·17	0/1·26	0/1·35	0/1·44	0/1·53	0/1·62	0/1·71	0/1·80
4	0/1·32	0/1·44	0/1·56	0/1·68	0/1·80	0/1·92	0/2·04	0/2·16	0/2·28	0/2·40
5	0/1·65	0/1·80	0/1·95	0/2·10	0/2·25	0/2·40	0/2·55	0/2·70	0/2·85	0/3·
6	0/1·98	0/2·16	0/2·34	0/2·52	0/2·70	0/2·88	0/3·06	0/3·24	0/3·42	0/3·60
7	0/2·31	0/2·52	0/2·73	0/2·94	0/3·15	0/3·36	0/3·57	0/3·78	0/3·99	0/4·20
8	0/2·64	0/2·88	0/3·12	0/3·36	0/3·60	0/3·84	0/4·08	0/4·32	0/4·56	0/4·80
9	0/2·97	0/3·24	0/3·51	0/3·78	0/4·05	0/4·32	0/4·59	0/4·86	0/5·13	0/5·40
10	0/3·30	0/3·60	0/3·90	0/4·20	0/4·50	0/4·80	0/5·10	0/5·40	0/5·70	0/6·
11	0/3·63	0/3·96	0/4·29	0/4·62	0/4·95	0/5·28	0/5·61	0/5·94	0/6·27	0/6·60
12	0/3·96	0/4·32	0/4·68	0/5·04	0/5·40	0/5·76	0/6·12	0/6·48	0/6·84	0/7·20
13	0/4·29	0/4·68	0/5·07	0/5·46	0/5·85	0/6·24	0/6·63	0/7·02	0/7·41	0/7·80
14	0/4·62	0/5·04	0/5·46	0/5·88	0/6·30	0/6·72	0/7·14	0/7·56	0/7·98	0/8·40
15	0/4·95	0/5·40	0/5·85	0/6·30	0/6·75	0/7·20	0/7·65	0/8·10	0/8·55	0/9·
16	0/5·28	0/5·76	0/6·24	0/6·72	0/7·20	0/7·68	0/8·16	0/8·64	0/9·12	0/9·60
17	0/5·61	0/6·12	0/6·63	0/7·14	0/7·65	0/8·16	0/8·67	0/9·18	0/9·69	0/10.20
18	0/5·94	0/6·48	0/7·02	0/7·56	0/8·10	0/8·64	0/9·18	0/9·72	0/10·26	0/10·80
19	0/6·27	0/6·84	0/7·41	0/7·98	0/8·55	0/9·12	0/9·69	0/10·26	0/10·83	0/11·40.
20	0/6·60	0/7·20	0/7·80	0/8·40	0/9·	0/9·60	0/10·20	0/10·80	0/11·40	1/0·
25	0/8·25	0/9·	0/9·75	0/10·50	0/11·25	1/0·	1/0·75	1/1·50	1/2·25	1/3·
30	0/9·90	0/10·80	0/11·70	1/0·60	1/1·50	1/2·40	1/3·30	1/4·20	1/5·10	1/6·
35	0/11·55	1/0·60	1/1·65	1/2·70	1/3·75	1/4·80	1/5·85	1/6·90	1/7·95	1/9·
40	1/1·20	1/2·40	1/3·60	1/4·80	1/6·	1/7·20	1/8·40	1/9·60	1/10·80	2/0·
45	1/2·85	1/4·20	1/5·55	1/6·90	1/8·25	1/9·60	1/10·95	2/0·30	2/1·65	2/3·
50	1/4·50	1/6·	1/7·50	1/9·	1/10·50	2/0·	2/1·50	2/3·	2/4·50	2/6·
55	1/6·15	1/7·80	1/9·45	1/11·10	2/0·75	2/2·40	2/4·05	2/5·70	2/7·35	2/9·
60	1/7·80	1/9·60	1/11·40	2/1·20	2/3·	2/4·80	2/6·60	2/8·40	2/10·20	3/0·
65	1/9·45	1/11·40	2/1·35	2/3·30	2/5·25	2/7·20	2/9·15	2/11·10	3/1·05	3/3·
70	1/11·10	2/1·20	2/3·30	2/5·40	2/7·50	2/9·60	2/11·70	3/1·80	3/3·90	3/6·
75	2/0·75	2/3·	2/5·25	2/7·50	2/9·75	3/0·	3/2·25	3/4·50	3/6·75	3/9·
80	2/2·40	2/4·80	2/7·20	2/9·60	3/0·	3/2·40	3/4·80	3/7·20	3/9·60	4/0·
85	2/4·05	2/6·60	2/9·15	2/11·70	3/2·25	3/4·80	3/7·35	3/9·90	4/0·45	4/3·
90	2/5·70	2/8·40	2/11·10	3/1·80	3/4·50	3/7·20	3/9·90	4/0·60	4/3·30	4/6·
95	2/7·35	2/10·20	3/1·05	3/3·90	3/6·75	3/9·60	4/0·45	4/3·30	4/6·15	4/9·
100	2/9·	3/0·	3/3·	3/6·	3/9·	4/0·	4/3·	4/6·	4/9·	5/0·

TABLE XXXI.—*Continued.*

VALUE of SAWING, or of BOARDS, per 100 Feet.

(5/3 to 7/6)

100 at 5/3	At 5/6	At 5/9	At 6/0	At 6/3	At 6/6	At 6/9	At 7/0	At 7/3	At 7/6
ft.									
1 0/0·63	0/0·66	0/0·69	0/0·72	0/0·75	0/0·78	0/0·81	0/0·84	0/0·87	0/0·90
2 0/1·26	0/1·32	0/1·38	0/1·44	0/1·50	0/1·56	0 1·62	0/1·68	0/1·74	0/1·80
3 0/1·89	0/1·98	0/2·07	0/2·16	0/2·25	0/2·34	0/2·43	0/2·52	0/2·61	0/2·70
4 0/2·52	0/2·64	0/2·76	0/2·88	0/3·	0/3·12	0/3·24	0/3·36	0/3·48	0/3·60
5 0/3·15	0/3·30	0/3·45	0/3·60	0/3·75	0/3·90	0/4·05	0/4·20	0/4·35	0/4·50
6 0/3·78	0/3·96	0/4·14	0/4·32	0/4·50	0/4·68	0/4·86	0/5·04	0/5·22	0/5·40
7 0/4·41	0/4·62	0/4·83	0/5·04	0/5·25	0/5·46	0/5·67	0/5·88	0/6·09	0/6·30
8 0/5·04	0/5·28	0/5·52	0/5·76	0/6·	0/6·24	0/6·48	0/6·72	0/6·96	0/7·20
9 0/5·67	0/5·94	0/6·21	0/6·48	0/6·75	0/7·02	0/7·29	0/7·56	0/7·83	0/8·10
10 0/6·30	0/6·60	0/6·90	0/7·20	0/7·50	0/7·80	0/8·10	0/8·40	0/8·70	0/9·
11 0/6·93	0/7·26	0/7·59	0/7·92	0/8·25	0/8·58	0/8·91	0/9·24	0/9·57	0/9·90
12 0/7·56	0/7·92	0/8·28	0/8·64	0/9·	0/9·36	0/9·72	0/10·08	0/10·44	0/10·80
13 0/8·19	0/8·58	0/8·97	0/9·36	0/9·75	0/10·14	0/10·53	0/10·92	0/11·31	0/11·70
14 0/8·82	0/9·24	0/9·66	0/10·08	0/10·50	0/10·92	0/11·34	0/11·76	1/0·18	1/0·60
15 0/9·45	0/9·90	0/10·35	0/10·80	0/11·25	0/11·70	1/0·15	1/0·60	1/1·05	1/1·50
16 0/10·08	0/10·56	0/11·04	0/11·52	1/0·	1/0·48	1/0·96	1/1·44	1/1·92	1/2·40
17 0/10·71	0/11·22	0/11·73	1/0·24	1/0·75	1/1·26	1/1·77	1/2·28	1/2·79	1/3·30
18 0/11·34	0/11·88	1/0·42	1/0·96	1/1·50	1/2·04	1/2·58	1/3·12	1/3·66	1/4·20
19 0/11·97	1/0·54	1/1·11	1/1·68	1/2·25	1/2·82	1/3·39	1/3·96	1/4·53	1/5·10
20 1/0·60	1/1·20	1/1·80	1/2·40	1/3·	1/3·60	1/4·20	1/4·80	1/5·40	1/6·
25 1/3·75	1/4·50	1/5·25	1/6·	1/6·75	1/7·50	1/8·25	1/9·	1/9·75	1/10·50
30 1/6·90	1/7·80	1/8·70	1/9·60	1/10·50	1/11·40	2/0·30	2/1·20	2/2·10	2/3·
35 1/10·05	1/11·10	2/0·15	2/1·20	2/2·25	2/3·30	2/4·35	2/5·40	2/6·45	2/7·50
40 2/1·20	2/2·40	2/3·60	2/4·80	2/6·	2/7·20	2/8·40	2/9·60	2/10·80	3/0·
45 2/4·35	2/5·70	2/7·05	2/8·40	2/9·75	2/11·10	3/0·45	3/1·80	3/3·15	3/4·50
50 2/7·50	2/9·	2/10·50	3/0·	3/1·50	3/3·	3/4·50	3/6·	3/7·50	3/9·
55 2/10·65	3/0·30	3/1·95	3/3·60	3/5·25	3/6·90	3/8·55	3/10·20	3/11·85	4/1·50
60 3/1·80	3/3·60	3/5·40	3/7·20	3/9·	3 10·80	4/0·60	4/2·40	4/4·20	4/6·
65 3/4·95	3/6·90	3/8·85	3/10·80	4/0·75	4/2·70	4/4·65	4/6·60	4/8·55	4/10·50
70 3/8·10	3/10·20	4/0·30	4/2·40	4/4·50	4/6·60	4/8·70	4 10·80	4/0·90	5/3·
75 3/11·25	4/1·50	4/3·75	4/6·	4/8·25	4/10·50	5/0·75	5/3·	5/5·25	5/7·50
80 4/2·40	4/4·80	4/7·20	4/9·60	5/0·	5/2·40	5/4·80	5/7·20	5/9·60	6/0·
85 4/5·55	4/8·10	4/10·65	5/1·20	5/3·75	5/6·30	5/8·85	5/11·40	6/1·95	6/4·50
90 4/8·70	4/11·40	5/2·10	5/4·80	5/7·50	5/10·20	6/0·90	6/3·60	6/6·30	6/9·
95 4/11·85	5/2·70	5/5·55	5/8·40	5/11·25	6/2·10	6/4·95	6/7·80	6/10·65	7/1·50
100 5/3·	5/6·	5/9·	6/0·	6/3·	6/6·	6/9·	7/0·	7/3·	7/6·

TABLE XXXI.—*Continued.*

VALUE of SAWING, or of BOARDS, per 100 Feet.

(7/9 to 10/0)

100 at 7/9		At 8/0	At 8/3	At 8/6	At 8/9	At 9/0	At 9/3	At 9/6	At 9/9	At 10/0
ft.										
1	0/0·93	0/0·96	0/0·99	0/1·02	0/1·05	0/1·08	0/1·11	0/1·14	0/1·17	0/1·20
2	0/1·86	0/1·92	0/1·98	0/2·04	0/2·10	0/2·16	0/2·22	0/2·28	0/2·34	0/2·40
3	0/2·79	0/2·88	0/2·97	0/3·06	0/3·15	0/3·24	0/3·33	0/3·42	0/3·51	0/3·60
4	0/3·72	0/3·84	0/3·96	0/4·08	0/4·20	0/4·32	0/4·44	0/4·56	0/4·68	0/4·80
5	0/4·65	0/4·80	0/4·95	0/5·10	0/5·25	0/5·40	0/5·55	0/5·70	0/5·85	0/6·
6	0/5·58	0/5·76	0/5·94	0/6·12	0/6·30	0/6·48	0/6·66	0/6·84	0/7·02	0/7·20
7	0/6·51	0/6·72	0/6·93	0/7·14	0/7·35	0/7·56	0/7·77	0/7·98	0/8·19	0/8·40
8	0/7·44	0/7·68	0/7·92	0/8·16	0/8·40	0/8·64	0/8·88	0/9·12	0/9·36	0/9·60
9	0/8·37	0/8·64	0/8·91	0/9·18	0/9·45	0/9·72	0/9·99	0/10·26	0/10·53	0/10·80
10	0/9·30	0/9·60	0/9·90	0/10·20	0/10·50	0/10·80	0/11·10	0/11·40	0/11·70	1/0·
11	0/10·23	0/10·56	0/10·89	0/11·22	0/11·55	0/11·88	1/0·21	1/0·54	1/0·87	1/1·20
12	0/11·16	0/11·52	0/11·88	1/0·24	1/0·60	1/0·96	1/1·32	1/1·68	1/2·04	1/2·40
13	1/0·09	1/0·48	1/0·87	1/1·26	1/1·65	1/2·04	1/2·43	1/2·82	1/3·21	1/3·60
14	1/1·02	1/1·44	1/1·86	1/2·28	1/2·70	1/3·12	1/3·54	1/3·96	1/4·38	1/4·80
15	1/1·95	1/2·40	1/2·85	1/3·30	1/3·75	1/4·20	1/4·65	1/5·10	1/5·55	1/6·
16	1/2·88	1/3·36	1/3·84	1/4·32	1/4·80	1/5·28	1/5·76	1/6·24	1/6·72	1/7·20
17	1/3·81	1/4·32	1/4·83	1/5·34	1/5·85	1/6·36	1/6·87	1/7·38	1/7·89	1/8·40
18	1/4·74	1/5·28	1/5·82	1/6·36	1/6·90	1/7·44	1/7·98	1/8·52	1/9·06	1/9·60
19	1/5·67	1/6·24	1/6·81	1/7·38	1/7·95	1/8·52	1/9·09	1/9·66	1/10·23	1/10·80
20	1/6·60	1/7·20	1/7·80	1/8·40	1/9·	1/9·60	1/10·20	1/10·80	1/11·40	2/0·
25	1/11·25	2/0·	2/0·75	2/1·50	2/2·25	2/3·	2/3·75	2/4·50	2/5·25	2/6·
30	2/3·90	2/4·80	2/5·70	2/6·60	2/7·50	2/8·40	2/9·30	2/10·20	2/11·10	3/0·
35	2/8·55	2/9·60	2/10·65	2/11·70	3/0·75	3/1·80	3/2·85	3/3·90	3/4·95	3/6·
40	3/1·20	3/2·40	3/3·60	3/4·80	3/6·	3/7·20	3/8·40	3/9·60	3/10·80	4/0·
45	3/5·85	3/7·20	3/8·55	3/9·90	3/11·25	4/0·60	4/1·95	4/3·30	4/4·65	4/6·
50	3/10·50	4/0·	4/1·50	4/3·	4/4·50	4/6·	4/7·50	4/9·	4/10·50	5/0·
55	4/3·15	4/4·80	4/6·45	4/8·10	4/9·75	4/11·40	5/1·05	5/2·70	5/4·35	5/6·
60	4/7·80	4/9·60	4/11·40	5/1·20	5/3·	5/4·80	5/6·60	5/8·40	5/10·20	6/0·
65	5/0·45	5/2·40	5/4·35	5/6·30	5/8·25	5/10·20	6/0·15	6/2·10	6/4·05	6/6·
70	5/5·10	5/7·20	5/9·30	5/11·40	6/1·50	6/3·60	6/5·70	6/7·80	6/9·90	7/0·
75	5/9·75	6/0·	6/2·25	6/4·50	6/6·75	6/9·	6/11·25	7/1·50	7/3·75	7/6·
80	6/2·40	6/4·80	6/7·20	6/9·60	7/0·	7/2·40	7/4·80	7/7·20	7/9·60	8/0·
85	6/7·05	6/9·60	7/0·15	7/2·70	7/5·25	7/7·80	7/10·35	8/0·90	8/3·45	8/6·
90	6/11·70	7/2·40	7/5·10	7/7·80	7/10·50	8/1·20	8/3·90	8/6·60	8/9·30	9/0·
95	7/4·35	7/7·20	7/10·05	8/0·90	8/3·75	8/6·60	8/9·45	9/0·30	9/3·15	9/6·
100	7/9·	8/0·	8/3·	8/6·	8/9·	9/0·	9/3·	9/6·	9/9·	10/0·

TABLE XXXI.—*Continued.*

VALUE of SAWING, or of BOARDS, per 100 Feet.

(10/3 to 12/6)

100 at 10/3		At 10/6	At 10/9	At 11/0	At 11/3	At 11/6	At 11/9	At 12/0	At 12/3	At 12/6
ft.										
1	0/1·23	0/1·26	0/1·29	0/1·32	0/1·35	0/1·38	0/1·41	0/1·44	0/1·47	0/1·50
2	0/2·46	0/2·52	0/2·58	0/2·64	0/2·70	0/2·76	0/2·82	0/2·88	0/2·94	0/3·
3	0/3·69	0/3·78	0/3·87	0/3·96	0/4·05	0/4·14	0/4·23	0/4·32	0/4·41	0/4·50
4	0/4·92	0/5·04	0/5·16	0/5·28	0/5·40	0/5·52	0/5·64	0/5·76	0/5·88	0/6·
5	0/6·15	0/6·30	0/6·45	0/6·60	0/6·75	0/6·90	0/7·05	0/7·20	0/7·35	0/7·50
6	0/7·38	0/7·56	0/7·74	0/7·92	0/8·10	0/8·28	0/8·46	0/8·64	0/8·82	0/9·
7	0/8·61	0/8·82	0/9·03	0/9·24	0/9·45	0/9·66	0/9·87	0/10·08	0/10·29	0/10·50
8	0/9·84	0/10·08	0/10·32	0/10·56	0/10·80	0/11·04	0/11·28	0/11·52	0/11·76	1/0·
9	0/11·07	0/11·34	0/11·61	0/11·88	1/0·15	1/0·42	1/0·69	1/0·96	1/1·23	1/1·50
10	1/0·30	1/0·60	1/0·90	1/1·20	1/1·50	1/1·80	1/2·10	1/2·40	1/2·70	1/3·
11	1/1·53	1/1·86	1/2·19	1/2·52	1/2·85	1/3·18	1/3·51	1/3·84	1/4·17	1/4·50
12	1/2·76	1/3·12	1/3·48	1/3·84	1/4·20	1/4·56	1/4·92	1/5·28	1/5·64	1/6·
13	1/3·99	1/4·38	1/4·77	1/5·16	1/5·55	1/5·94	1/6·33	1/6·72	1/7·11	1/7·50
14	1/5·22	1/5·64	1/6·06	1/6·48	1/6·90	1/7·32	1/7·74	1/8·16	1/8·58	1/9·
15	1/6·45	1/6·90	1/7·35	1/7·80	1/8·25	1/8·70	1/9·15	1/9·60	1/10·05	1/10·50
16	1/7·68	1/8·16	1/8·64	1/9·12	1/9·60	1/10·08	1/10·56	1/11·04	1/11·52	2/0·
17	1/8·91	1/9·42	1/9·93	1/10·44	1/10·95	1/11·46	1/11·97	2/0·48	2/0·99	2/1·50
18	1/10·14	1/10·68	1/11·22	1/11·76	2/0·30	2/0·84	2/1·38	2/1·92	2/2·46	2/3·
19	1/11·37	1/11·94	2/0·51	2/1·08	2/1·65	2/2·22	2/2·79	2/3·36	2/3·93	2/4·50
20	2/0·60	2/1·20	2/1·80	2/2·40	2/3·	2/3·60	2/4·20	2/4·80	2/5·40	2/6·
25	2/6·75	2/7·50	2/8·25	2/9·	2/9·75	2/10·50	2/11·25	3/0·	3/0·75	3/1·50
30	3/0·90	3/1·80	3/2·70	3/3·60	3/4·50	3/5·40	3/6·30	3/7·20	3/8·10	3/9·
35	3/7·05	3/8·10	3/9·15	3/10·20	3/11·25	4/0·30	4/1·35	4/2·40	4/3·45	4/4·50
40	4/1·20	4/2·40	4/3·60	4/4·80	4/6·	4/7·20	4/8·40	4/9·60	4/10·80	5/0·
45	4/7·35	4/8·70	4/10·05	4/11·40	5/0·75	5/2·10	5/3·45	5/4·80	5/6·15	5/7·50
50	5/1·50	5/3·	5/4·50	5/6·	5/7·50	5/9·	5/10·50	6/0·	6/1·50	6/3·
55	5/7·65	5/9·30	5/10·95	6/0·60	6/2·25	6/3·90	6/5·55	6/7·20	6/8·85	6/10·50
60	6/1·80	6/3·60	6/5·40	6/7·20	6/9·	6/10·80	7/0·60	7/2·40	7/4·20	7/6·
65	6/7·95	6/9·90	6/11·85	7/1·80	7/3·75	7/5·70	7/7·65	7/9·60	7/11·55	8/1·50
70	7/2·10	7/4·20	7/6·30	7/8·40	7/10·50	8/0·60	8/2·70	8/4·80	8/6·90	8/9·
75	7/8·25	7/10·50	8/0·75	8/3·	8/5·25	8/7·50	8/9·75	9/0·	9/2·25	9/4·50
80	8/2·40	8/4·80	8/7·20	8/9·60	9/0·	9/2·40	9/4·80	9/7·20	9/9·60	10/0·
85	8/8·55	8/11·10	9/1·65	9/4·20	9/6·75	9/9·30	9/11·85	10/2·40	10/4·95	10/7·50
90	9/2·70	9/5·40	9/8·10	9/10·80	10/1·50	10/4·20	10/6·90	10/9·60	11/0·30	11/3·
95	9/8·85	9/11·70	10/2·55	10/5·40	10/8·25	10/11·10	11/1·95	11/4·80	11/7·65	11/10·50
100	10/3·	10/6·	10/9·	11/0·	11/3·	11/6·	11/9·	12/0·	12/3·	12/6·

TABLE XXXI.—*Continued.*

VALUE of SAWING, or of BOARDS, per 100 Feet.

(12/9 to 15/0)

100 at 12/9		At 13/0	At 13/3	At 13/6	At 13/9	At 14/0	At 14/3	At 14/6	At 14/9	At 15/0
ft.										
1	0/1·53	0/1·56	0/1·59	0/1·62	0/1·65	0/1·68	0/1·71	0/1·74	0/1·77	0/1·80
2	0/3·06	0/3·12	0/3·18	0/3·24	0/3·30	0/3·36	0/3·42	0/3·48	0/3·54	0/3·60
3	0/4·59	0/4·68	0/4·77	0/4·86	0/4·95	0/5·04	0/5·13	0/5·22	0/5·31	0/5·40
4	0/6·12	0/6·24	0/6·36	0/6·48	0/6·60	0/6·72	0/6·84	0/6·96	0/7·08	0/7·20
5	0/7·65	0/7·80	0/7·95	0/8·10	0/8·25	0/8·40	0/8·55	0/8·70	0/8·85	0/9·
6	0/9·18	0/9·36	0/9·54	0/9·72	0/9·90	0/10·08	0/10·26	0/10·44	0/10·62	0/10·80
7	0/10·71	0/10·92	0/11·13	0/11·34	0/11·55	0/11·76	0/11·97	1/0·18	1/0·39	1/0·60
8	1/0·24	1/0·48	1/0·72	1/0·96	1/1·20	1/1·44	1/1·68	1/1·92	1/2·16	1/2·40
9	1/1·77	1/2·04	1/2·31	1/2·58	1/2·85	1/3·12	1/3·39	1/3·66	1/3·93	1/4·20
10	1/3·30	1/3·60	1/3·90	1/4·20	1/4·50	1/4·80	1/5·10	1/5·40	1/5·70	1/6·
11	1/4·83	1/5·16	1/5·49	1/5·82	1/6·15	1/6·48	1/6·81	1/7·14	1/7·47	1/7·80
12	1/6·36	1/6·72	1/7·08	1/7·44	1/7·80	1/8·16	1/8·52	1/8·88	1/9·24	1/9·60
13	1/7·89	1/8·28	1/8·67	1/9·06	1/9·45	1/9·84	1/10·23	1/10·62	1/11·01	1/11·40
14	1/9·42	1/9·84	1/10·26	1/10·68	1/11·10	1/11·52	1/11·94	2/0·36	2/0·78	2/1·20
15	1/10·95	1/11·40	1/11·85	2/0·30	2/0·75	2/1·20	2/1·65	2/2·10	2/2·55	2/3·
16	2/0·48	2/0·96	2/1·44	2/1·92	2/2·40	2/2·88	2/3·36	2/3·84	2/4·32	2/4·80
17	2/2·01	2/2·52	2/3·03	2/3·54	2/4·05	2/4·56	2/5·07	2/5·58	2/6·09	2/6·60
18	2/3·54	2/4·08	2/4·62	2/5·16	2/5·70	2/6·24	2/6·78	2/7·32	2/7·86	2/8·40
19	2/5·07	2/5·64	2/6·21	2/6·78	2/7·35	2/7·92	2/8·49	2/9·06	2/9·63	2/10·20
20	2/6·60	2/7·20	2/7·80	2/8·40	2/9·	2/9·60	2/10·20	2/10·80	2/11·40	3/0·
25	3/2·25	3/3·	3/3·75	3/4·50	3/5·25	3/6·	3/6·75	3/7·50	3/8·25	3/9·
30	3/9·90	3/10·80	3/11·70	4/0·60	4/1·50	4/2·40	4/3·30	4/4·20	4/5·10	4/6·
35	4/5·55	4/6·60	4/7·65	4/8·70	4/9·75	4/10·80	4/11·85	5/0·90	5/1·95	5/3·
40	5/1·20	5/2·40	5/3·60	5/4·80	5/6·	5/7·20	5/8·40	5/9·60	5/10·80	6/0·
45	5/8·85	5/10·20	5/11·55	6/0·90	6/2·25	6/3·60	6/4·95	6/6·30	6/7·65	6/9·
50	6/4·50	6/6·	6/7·50	6/9·	6/10·50	7/0·	7/1·50	7/3·	7/4·50	7/6·
55	7/0·15	7/1·80	7/3·45	7/5·10	7/6·75	7/8·40	7/10·05	7/11·70	8/1·35	8/3·
60	7/7·80	7/9·60	7/11·40	8/1·20	8/3·	8/4·80	8/6·60	8/8·40	8/10·20	9/0·
65	8/3·45	8/5·40	8/7·35	8/9·30	8/11·25	9/1·20	9/3·15	9/5·10	9/7·05	9/9·
70	8/11·10	9/1·20	9/3·30	9/5·40	9/7·50	9/9·60	9/11·70	10/1·80	10/3·90	10/6·
75	9/6·75	9/9·	9/11·25	10/1·50	10/3·75	10/6·	10/8·25	10/10·50	11/0·75	11/3·
80	10/2·40	10/4·80	10/7·20	10/9·60	11/0·	11/2·40	11/4·80	11/7·20	11/9·60	12/0·
85	10/10·05	11/0·60	11/3·15	11/5·70	11/8·25	11/10·80	12/1·35	12/3·90	12/6·45	12/9·
90	11/5·70	11/8·40	11/11·10	12/1·80	12/4·50	12/7·20	12/9·90	13/0·60	13/3·30	13/6·
95	12/1·35	12/4·20	12/7·05	12/9·90	13/0·75	13/3·60	13/6·45	13/9·30	14/0·15	14/3·
100	12/9·	13/0·	13/3·	13/6·	13/9·	14/0·	14/3·	14/6·	14/9·	15/0·

TABLE XXXI.—*Continued.*

VALUE of SAWING, or of BOARDS, per 100 feet.

(15/3 to 17/6)

100 at 15/3		At 15/6	At 15/9	At 16/0	At 16/3	At 16/6	At 16/9	At 17/0	At 17/3	At 17/6
ft.										
1	0/1·83	0/1·86	0/1·89	0/1·92	0/1·95	0/1·98	0/2·01	0/2·04	0/2·07	0/2·10
2	0/3·66	0/3·72	0/3·78	0/3·84	0/3·90	0/3·96	0/4·02	0/4·08	0/4·14	0/4·20
3	0/5·49	0/5·58	0/5·67	0/5·76	0/5·85	0/5·94	0/6·03	0/6·12	0/6·21	0/6·30
4	0/7·32	0/7·44	0/7·56	0/7·68	0/7·80	0/7·92	0/8·04	0/8·16	0/8·28	0/8·40
5	0/9·15	0/9·30	0/9·45	0/9·60	0/9·75	0/9·90	0/10·05	0/10·20	0/10·35	0/10·50
6	0/10·98	0/11·16	0/11·34	0/11·52	0/11·70	0/11·88	1/0·06	1/0·24	1/0·42	1/0·60
7	1/0·81	1/1·02	1/1·23	1/1·44	1/1·65	1/1·86	1/2·07	1/2·28	1/2·49	1/2·70
8	1/2·64	1/2·88	1/3·12	1/3·36	1/3·60	1/3·84	1/4·08	1/4·32	1/4·56	1/4·80
9	1/4·47	1/4·74	1/5·01	1/5·28	1/5·55	1/5·82	1/6·09	1/6·36	1/6·63	1/6·90
10	1/6·30	1/6·60	1/6·90	1/7·20	1/7·50	1/7·80	1/8·10	1/8·40	1/8·70	1/9·
11	1/8·13	1/8·46	1/8·79	1/9·12	1/9·45	1/9·78	1/10·11	1/10·44	1/10·77	1/11·10
12	1/9·96	1/10·32	1/10·68	1/11·04	1/11·40	1/11·76	2/0·12	2/0·48	2/0·84	2/1·20
13	1/11·79	2/0·18	2/0·57	2/0·96	2/1·35	2/1·74	2/2·13	2/2·52	2/2·91	2/3·30
14	2/1·62	2/2·04	2/2·46	2/2·88	2/3·30	2/3·72	2/4·14	2/4·56	2/4·98	2/5·40
15	2/3·45	2/3·90	2/4·35	2/4·80	2/5·25	2/5·70	2/6·15	2/6·60	2/7·05	2/7·50
16	2/5·28	2/5·76	2/6·24	2/6·72	2/7·20	2/7·68	2/8·16	2/8·64	2/9·12	2/9·60
17	2/7·11	2/7·62	2/8·13	2/8·64	2/9·15	2/9·66	2/10·17	2/10·68	2/11·19	2/11·70
18	2/8·94	2/9·48	2/10·02	2/10·56	2/11·10	2/11·64	3/0·18	3/0·72	3/1·26	3/1·80
19	2/10·77	2/11·34	2/11·91	3/0·48	3/1·05	3/1·62	3/2·19	3/2·76	3/3·33	3/3·90
20	3/0·60	3/1·20	3/1·80	3/2·40	3/3·	3/3·60	3/4·20	3/4·80	3/5·40	3/6·
25	3/9·75	3/10·50	3/11·25	4/0·	4/0·75	4/1·50	4/2·25	4/3·	4/3·75	4/4·50
30	4/6·90	4/7·80	4/8·70	4/9·60	4/10·50	4/11·40	5/0·30	5/1·20	5/2·10	5/3·
35	5/4·05	5/5·10	5/6·15	5/7·20	5/8·25	5/9·30	5/10·35	5/11·40	6/0·45	6/1·50
40	6/1·20	6/2·40	6/3·60	6/4·80	6/6·	6/7·20	6/8·40	6/9·60	6/10·80	7/0·
45	6/10·35	6/11·70	7/1·05	7/2·40	7/3·75	7/5·10	7/6·45	7/7·80	7/9·15	7/10·50
50	7/7·50	7/9·	7/10·50	8/0·	8/1·50	8/3·	8/4·50	8/6·	8/7·50	8/9·
55	8/4·65	8/6·30	8/7·95	8/9·60	8/11·25	9/0·90	9/2·55	9/4·20	9/5·85	9/7·50
60	9/1·80	9/3·60	9/5·40	9/7·20	9/9·	9/10·80	10/0·60	10/2·40	10/4·20	10/6·
65	9/10·95	10/0·90	10/2·85	10/4·80	10/6·75	10/8·70	10/10·65	11/0·60	11/2·55	11/4·50
70	10/8·10	10/10·20	11/0·30	11/2·40	11/4·50	11/6·60	11/8·70	11/10·80	12/0·90	12/3·
75	11/5·25	11/7·50	11/9·75	12/0·	12/2·25	12/4·50	12/6·75	12/9·	12/11·25	13/1·50
80	12/2·40	12/4·80	12/7·20	12/9·60	13/0·	13/2·40	13/4·80	13/7·20	13/9·60	14/0·
85	12/11·55	13/2·10	13/4·65	13/7·20	13/9·75	14/0·30	14/2·85	14/5·40	14/7·95	14/10·50
90	13/8·70	13/11·40	14/2·10	14/4·80	14/7·50	14/10·20	15/0·90	15/3·60	15 6·30	15/9·
95	14/5·85	14/8·70	14/11·55	15/2·40	15/5·25	15/8·10	15/10·95	16/1·80	16/4·65	16/7·50
100	15/3·	15/6·	15/9·	16/0·	16/3·	16/6·	16/9·	17/0·	17/3·	17/6·

TABLE XXXI.—*Continued.*

VALUE of SAWING, or of BOARDS, per 100 Feet.

(17/9 to 20/0)

100 at 17/9	At 18/0	At 18/3	At 18/6	At 18/9	At 19/0	At 19/3	At 19/6	At 19/9	At 20/0
ft.									
1	0/2·13	0/2·16	0/2·19	0/2·22	0/2·25	0/2·28	0/2·31	0/2·34	0/2·37	0/2·40
2	0/4·26	0/4·32	0/4·38	0/4·44	0/4·50	0/4·56	0/4·62	0/4·68	0/4·74	0/4·80
3	0/6·39	0/6·48	0/6·57	0/6·66	0/6·75	0/6·84	0/6·93	0/7·02	0/7·11	0/7·20
4	0/8·52	0/8·64	0/8·76	0/8·88	0/9·	0/9·12	0/9·24	0/9·36	0/9·48	0/9·60
5	0/10·65	0/10·80	0/10·95	0/11·10	0/11·25	0/11·40	0/11·55	0/11·70	0/11·85	1/0·
6	1/0·78	1/0·96	1/1·14	1/1·32	1/1·50	1/1·68	1/1·86	1/2·04	1/2·22	1/2·40
7	1/2·91	1/3·12	1/3·33	1/3·54	1/3·75	1/3·96	1/4·17	1/4·38	1/4·59	1/4·80
8	1/5·04	1/5·28	1/5·52	1/5·76	1/6·	1/6·24	1/6·48	1/6·72	1/6·96	1/7·20
9	1/7·17	1/7·44	1/7·71	1/7·98	1/8·25	1/8·52	1/8·79	1/9·06	1/9·33	1/9·60
10	1/9·30	1/9·60	1/9·90	1/10·20	1/10·50	1/10·80	1/11·10	1/11·40	1/11·70	2/0·
11	1/11·43	1/11·76	2/0·09	2/0·42	2/0·75	2/1·08	2/1·41	2/1·74	2/2·07	2/2.40
12	2/1·56	2/1·92	2/2·28	2/2·64	2/3·	2/3·36	2/3·72	2/4·08	2/4·44	2/4·80
13	2/3·69	2/4·08	2/4·47	2/4·86	2/5·25	2/5·64	2/6·03	2/6·42	2/6·81	2/7·20
14	2/5·82	2/6·24	2/6·66	2/7·08	2/7·50	2/7·92	2/8·34	2/8·76	2/9·18	2/9·60
15	2/7·95	2/8.40	2/8·85	2/9·30	2/9·75	2/10·20	2/10·65	2/11·10	2/11·55	3/0·
16	2/10·08	2/10·56	2/11·04	2/11·52	3/0·	3/0·48	3/0·96	3/1·44	3/1·92	3/2·40
17	3/0·21	3/0·72	3/1·23	3/1·74	3/2·25	3/2·76	3/3·27	3/3·78	3/4·29	3/4·80
18	3/2·34	3/2·88	3/3·42	3/3·96	3/4·50	3/5·04	3/5·58	3/6·12	3/6·66	3/7·20
19	3/4·47	3/5·04	3/5·61	3/6·18	3/6·75	3/7·32	3/7·89	3/8·46	3/9·03	3/9·60
20	3/6·60	3/7·20	3/7·80	3/8·40	3/9·	3/9·60	3/10·20	3/10·80	3/11·40	4/0·
25	4/5·25	4/6·	4/6·75	4/7·50	4/8·25	4/9·	4/9·75	4/10·50	4/11·25	5/0·
30	5/3·90	5/4·80	5/5·70	5/6·60	5/7·50	5/8·40	5/9·30	5/10·20	5/11·10	6/0·
35	6/2·55	6/3·60	6/4·65	6/5·70	6/6·75	6/7·80	6/8·85	6/9·90	6/10·95	7/0·
40	7/1·20	7/2·40	7/3·60	7/4·80	7/6·	7/7·20	7/8·40	7/9·60	7/10·80	8/0·
45	7/11·85	8/1·20	8/2·55	8/3·90	8/5·25	8/6·60	8/7·95	8/9·30	8/10·65	9/0·
50	8/10·50	9/0·	9/1·50	9/3·	9/4·50	9/6·	9/7·50	9/9·	9/10·50	10/0·
55	9/9·15	9/10·80	10/0·45	10/2·10	10/3·75	10/5·40	10/7·05	10/8·70	10/10·35	11/0·
60	10/7·80	10/9·60	10/11·40	11/1·20	11/3·	11/4·80	11/6·60	11/8·40	11/10·20	12/0·
65	11/6·45	11/8·40	11/10·35	12/0·30	12/2·25	12/4·20	12/6·15	12/8·10	12/10·05	13/0·
70	12/5·10	12/7·20	12/9·30	12/11·40	13/1·50	13/3·60	13/5·70	13/7·80	13/9·90	14/0·
75	13/3·75	13/6·	13/8·25	13/10·50	14/0·75	14/3·	14/5·25	14/7·50	14/9·75	15/0·
80	14/2·40	14/4·80	14/7·20	14/9·60	15/0·	15/2·40	15/4·80	15/7·20	15/9·60	16/0·
85	15/1·05	15/3·60	15/6·15	15/8·70	15/11·25	16/1·80	16/4·35	16/6·90	16/9·45	17/0·
90	15/11·70	16/2·40	16/5·10	16/7·80	16/10·50	17/1·20	17/3·90	17/6·60	17/9·30	18/0·
95	16/10·35	17/1·20	17/4·05	17/6·90	17/9·75	18/0·60	18/3·45	18/6·30	18/9.15	19/0·
100	17/9·	18/0·	18/3·	18/6·	18/9·	19/0·	19/3·	19/6·	19/9·	20/0·

TABLE XXXII.

Wages Calculator, per Day.

(0/3 to 6/0)

One Week,	0/3	0/6	0/9	1/0	1/6	2/0	2/6	3/0	3/6	4/0	4/6	5/0	5/6	6/0
1 day	0/0½	0/1	0/1½	0/2	0/3	0/4	0/5	0/6	0/7	0/8	0/9	0/10	0/11	1/
2 „	0/1	0/2	0/3	0/4	0/6	0/8	0/10	1/	1/2	1/4	1/6	1/8	1/10	2/
3 „	0/1½	0/3	0/4½	0/6	0/9	1/0	1/3	1/6	1/9	2/	2/3	2/6	2/9	3/
4 „	0/2	0/4	0/6	0/8	1/	1/4	1/8	2/	2/4	2/8	3/	3/4	3/8	4/
5 „	0/2½	0/5	0/7½	0/10	1/3	1/8	2/1	2/6	2/11	3/4	3/9	4/2	4/7	5/
6 „	0/3	0/6	0/9	1/	1/6	2/	2/6	3/	3/6	4/	4/6	5/	5/6	6/
7 „	0/3½	0/7	0/10½	1/2	1/9	2/4	2/11	3/6	4/1	4/8	5/3	5/10	6/5	7/
8 „	0/4	0/8	1/	1/4	2/	2/8	3/4	4/	4/8	5/4	6/	6/8	7/4	8/
9 „	0/4½	0/9	1/1½	1/6	2/3	3/	3/9	4/6	5/3	6/	6/9	7/6	8/3	9/
10 „	0/5	0/10	1/3	1/8	2/6	3/4	4/2	5/	5/10	6/8	7/6	8/4	9/2	10/
11 „	0/5½	0/11	1/4½	1/10	2/9	3/8	4/7	5/6	6/5	7/4	8/3	9/2	10/1	11/
12 „	0/6	1/0	1/6	2/	3/	4/	5/	6/	7/	8/	9/	10/	11/	12/
13 „	0/6½	1/1	1/7½	2/2	3/3	4/4	5/5	6/6	7/7	8/8	9/9	10/10	11/11	13/
14 „	0/7	1/2	1/9	2/4	3/6	4/8	5/10	7/	8/2	9/4	10/6	11/8	12/10	14/
15 „	0/7½	1/3	1/10½	2/6	3/9	5/	6/3	7/6	8/9	10/	11/3	12/6	13/9	15/
16 „	0/8	1/4	2/	2/8	4/	5/4	6/8	8/	9/4	10/8	12/	13/4	14/8	16/
17 „	0/8½	1/5	2/1½	2/10	4/3	5/8	7/1	8/6	9/11	11/4	12/9	14/2	15/7	17/
18 „	0/9	1/6	2/3	3/	4/6	6/	7/6	9/	10/6	12/	13/6	15/	16/6	18/
19 „	0/9½	1/7	2/4½	3/2	4/9	6/4	7/11	9/6	11/1	12/8	14/3	15/10	17/5	19/
20 „	0/10	1/8	2/6	3/4	5/	6/8	8/4	10/	11/8	13/4	15/	16/8	18/4	20/
21 „	0/10½	1/9	2/7½	3/6	5/3	7/	8/9	10/6	12/3	14/	15/9	17/6	19/3	21/
22 „	0/11	1/10	2/9	3/8	5/6	7/4	9/2	11/	12/10	14/8	16/6	18/4	20/2	22/
23 „	0/11½	1/11	2/10½	3/10	5/9	7/8	9/7	11/6	13/5	15/4	17/3	19/2	21/1	23/
24 „	1/	2/	3/	4/	6/	8/	10/	12/	14/	16/	18/	20/	22/	24/
25 „	1/0½	2/1	3/1½	4/2	6/3	8/4	10/5	12/6	14/7	16/8	18/9	20/10	22/11	25/
26 „	1/1	2/2	3/4	4/4	6/6	8/8	10/10	13/	15/2	17/4	19/6	21/8	23/10	26/
27 „	1/1½	2/3	3/4½	4/6	6/9	9/	11/3	13/6	15/9	18/	20/3	22/6	24/9	27/
28 „	1/2	2/4	3/6	4/8	7/	9/4	11/8	14/	16/4	18/8	21/	23/4	25/8	28/
29 „	1/2½	2/5	3/7½	4/10	7/3	9/8	12/1	14/6	16/11	19/4	21/9	24/2	26/7	29/
30 „	1/3	2/6	3/9	5/	7/6	10/	12/6	15/	17/6	20/	22/6	25/	27/6	30/
31 „	1/3½	2/7	3/10½	5/2	7/9	10/4	12/11	15/6	18/1	20/8	23/3	25/10	28/5	31/
32 „	1/4	2/8	4/	5/4	8/	10/8	13/4	16/	18/8	21/4	24/	26/8	29/4	32/
33 „	1/4½	2/9	4/1½	5/6	8/3	11/	13/9	16/6	19/3	22/	24/9	27/6	30/3	33/
34 „	1/5	2/10	4/3	5/8	8/6	11/4	14/2	17/	19/10	22/8	25/6	28/4	31/2	34/
35 „	1/5½	2/11	4/4½	5/10	8/9	11/8	14/7	17/6	20/5	23/4	26/3	29/2	32/1	35/

TABLE XXXII.—*Continued.*

WAGES CALCULATOR, per Day.

(6/6 to 13/0)

One Week,	6/6	7/0	7/6	8/0	8/6	9/0	9/6	10/0	10/6	11/0	11/6	12/0	12/6	13/0
1 day	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	2/	2/1	2/2
2 „	2/2	2/4	2/6	2/8	2/10	3/	3/2	3/4	3/6	3/8	3/10	4/	4/2	4/4
3 „	3/3	3/6	3/9	4/	4/3	4/6	4/9	5/	5/3	5/6	5/9	6/	6/3	6/6
4 „	4/4	4/8	5/	5/4	5/8	6/	6/4	6/8	7/	7/4	7/8	8/	8/4	8/8
5 „	5/5	5/10	6/3	6/8	7/1	7/6	7/11	8/4	8/9	9/2	9/7	10/	10/5	10/10
6 „	6/6	7/	7/6	8/	8/6	9/	9/6	10/	10/6	11/	11/6	12/	12/6	13/
7 „	7/7	8/2	8/9	9/4	9/11	10/6	11/1	11/8	12/3	12/10	13/5	14/	14/7	15/2
8 „	8/8	9/4	10/	10/8	11/4	12/	12/8	13/4	14/	14/8	15/4	16/	16/8	17/4
9 „	9/9	10/6	11/3	12/	12/9	13/6	14/3	15/	15/9	16/6	17/3	18/	18/9	19/6
10 „	10/10	11/8	12/6	13/4	14/2	15/	15/10	16/8	17/6	18/4	19/2	20/	20/10	21/8
11 „	11/11	12/10	13/9	14/8	15/7	16/6	17/5	18/4	19/3	20/2	21/1	22/	22/11	23/10
12 „	13/	14/	15/	16/	17/	18/	19/	20/	21/	22/	23/	24/	25/	26/
13 „	14/1	15/2	16/3	17/4	18/5	19/6	20/7	21/8	22/9	23/10	24/11	26/	27/1	28/2
14 „	15/2	16/4	17/6	18/8	19/10	21/	22/2	23/4	24/6	25/8	26/10	28/	29/2	30/4
15 „	16/3	17/6	18/9	20/	21/3	22/6	23/9	25/	26/3	27/6	28/9	30/	31/3	32/6
16 „	17/4	18/8	20/	21/4	22/8	24/	25/4	26/8	28/	29/4	30/8	32/	33/4	34/8
17 „	18/5	19/10	21/3	22/8	24/1	25/6	26/11	28/4	29/9	31/2	32/7	34/	35/5	36/10
18 „	19/6	21/	22/6	24/	25/6	27/	28/6	30/	31/6	33/	34/6	36/	37/6	39/
19 „	20/7	22/2	23/9	25/4	26/11	28/6	30/1	31/8	33/3	34/10	36/5	38/	39/7	41/2
20 „	21/8	23/4	25/	26/8	28/4	30/	31/8	33/4	35/	36/8	38/4	40/	41/8	43/4
21 „	22/9	24/6	26/3	28/	29/9	31/6	33/3	35/	36/9	38/6	40/3	42/	43/9	45/6
22 „	23/10	25/8	27/6	29/4	31/2	33/	34/10	36/8	38/6	40/4	42/2	44/	45/10	47/8
23 „	24/11	26/10	28/9	30/8	32/7	34/6	36/5	38/4	40/3	42/2	44/1	46/	47/11	49/10
24 „	26/	28/	30/	32/	34/	36/	38/	40/	42/	44/	46/	48/	50/	52/
25 „	27/1	29/2	31/3	33/4	35/5	37/6	39/7	41/8	43/9	45/10	47/11	50/	52/1	54/2
26 „	28/2	30/4	32/6	34/8	36/10	39/	41/2	43/4	45/6	47/8	49/10	52/	54/2	56/4
27 „	29/3	31/6	33/9	36/	38/3	40/6	42/9	45/	47/3	49/6	51/9	54/	56/3	58/6
28 „	30/4	32/8	35/	37/4	39/8	42/	44/4	46/8	49/	51/4	53/8	56/	58/4	60/8
29 „	31/5	33/10	36/3	38/8	41/1	43/6	45/11	48/4	50/9	53/2	55/7	58/	60/5	62/10
30 „	32/6	35/	37/6	40/	42/6	45/	47/6	50/	52/6	55/	57/6	60/	62/6	65/
31 „	33/7	36/2	38/9	41/4	43/11	46/6	49/1	51/8	54/3	56/10	59/5	62/	64/7	67/2
32 „	34/8	37/4	40/	42/8	45/4	48/	50/8	53/4	56/	58/8	61/4	64/	66/8	69/4
33 „	35/9	38/6	41/3	44/	46/9	49/6	52/3	55/	57/9	60/6	63/3	66/	68/9	71/6
34 „	36/10	39/8	42/6	45/4	48/2	51/	53/10	56/8	59/6	62/4	65/2	68/	70/10	73/8
35 „	37/11	40/10	43/9	46/8	49/7	52/6	55/5	58/4	61/3	64/2	67/1	70/	72/11	75/10

TABLE XXXII.—*Continued.*

WAGES CALCULATOR, per Day.

(13/6 to 20/0)

One Week,	13/6	14/0	14/6	15/0	15/6	16/0	16/6	17/0	17/6	18/0	18/6	19/0	19/6	20/0
1 day	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	3/	3/1	3/2	3/3	3/4
2 „	4/6	4/8	4/10	5/	5/2	5/4	5/6	5/8	5/10	6/	6/2	6/ 4	6/6	6/8
3 „	6/9	7/	7/3	7/6	7/9	8/	8/3	8/6	8/9	9/	9/3	9/6	9/9	10/
4 „	9/	9/4	9/8	10/	10/4	10/8	11/	11/4	11/8	12/	12/4	12/8	13/	13/4
5 „	11/3	11/8	12/1	12/6	12/11	13/4	13/9	14/2	14/7	15/	15/5	15/10	16/3	16/8
6 „	13/6	14/	14/6	15/	15/6	16/	16/6	17/	17/6	18/	18/6	19/	19/6	20/
7 „	15/9	16/4	16/11	17/6	18/1	18/8	19/3	19/10	20/5	21/	21/7	22/2	22/9	23/4
8 „	18/	18/8	19/4	20/	20/8	21/4	22/	22/8	23/4	24/	24/8	25/4	26/	26/8
9 „	20/3	21/	21/9	22/6	23/3	24/	24/9	25/6	26/3	27/	27/9	28/6	29/3	30/
10 „	22/6	23/4	24/2	25/	25/10	26/8	27/6	28/4	29/2	30/	30/10	31/8	32/6	33/4
11 „	24/9	25/8	26/7	27/6	28/5	29/4	30/3	31/2	32/1	33/	33/11	34/10	35/9	36/8
12 „	27/	28/	29/	30/	31/	32/	33/	34/	35/	36/	37/	38/	39/	40/
13 „	29/3	30/4	31/5	32/6	33/7	34/8	35/9	36/10	37/11	39/	40/1	41/2	42/3	43/4
14 „	31/6	32/8	33/10	35/	36/2	37/4	38/6	39/8	40/10	42/	43/2	44/4	45/6	46/8
15 „	33/9	35/	36/3	37/6	38/9	40/	41/3	42/6	43/9	45/	46 3	47/6	48/9	50/
16 „	36/	37/4	38/8	40/	41/4	42/8	44/	45/4	46/8	48/	49/4	50/8	52/	53/4
17 „	38/3	39/8	41/1	42/6	43/11	45/4	46/9	48/2	49/7	51/	52/5	53/10	55/3	56/8
18 „	40/6	42/	43/6	45/	46/6	48/	49/6	51/	52/6	54/	55/6	57/	58/6	60/
19 „	42/9	44/4	45/11	47/6	49/1	50/8	52/3	53/10	55/5	57/	58/7	60/2	61/9	63/4
20 „	45/	46/8	48/4	50/	51/8	53/4	55/	56/8	58/4	60/	61/8	63/4	65/	66/8
21 „	47/3	49/	50/9	52/6	54/3	56/	57/9	59/6	61/3	63/	64/9	66/6	68/3	70/
22 „	49/6	51/4	53/2	55/	56/10	58/8	60/6	62/4	64/2	66/	67/10	69/8	71/6	73/4
23 „	51/9	53/8	55/7	57/6	59/5	61/4	63/3	65/2	67/1	69/	70/11	72/10	74/9	76/8
24 „	54/	56/	58/	60/	62/	64/	66/	68/	70/	72/	74/	76/	78/	80/
25 „	56/3	58/4	60/5	62/6	64/7	66/8	68/9	70/10	72/11	75/	77/1	79/2	81/3	83/4
26 „	58/6	60/8	62/10	65/	67/2	69/4	71/6	73/8	75/10	78/	80/2	82/4	84/6	86/8
27 „	60/9	63/	65/3	67/6	69/9	72/	74/3	76/6	78/9	81/	83/3	85/6	87/9	90/
28 „	63/	65/4	67/8	70/	72/4	74/8	77/	79/4	81/8	84/	86/4	88/8	91/	93/4
29 „	65/3	67/8	70/1	72/6	74/11	77/4	79/9	82/2	88/7	87/	89/5	91/10	94/3	96/8
30 „	67/6	70/	72/6	75/	77/6	80/	82/6	85/	87/6	90/	92/6	95/	97/6	100/
31 „	69/9	72/4	74/11	77/6	80/1	82/8	85/3	87/10	90/5	93/	95/7	98/2	100/9	103/4
32 „	72/	74/8	77/4	80/	82/8	85/4	88/	90/8	93/4	96/	98/8	101/4	104/	106/8
33 „	74/3	77/	79/9	82/6	85/3	88/	90/9	93/6	96/3	99/	101/9	104/6	107/3	110/
34 „	76/6	79/4	82/2	85/	87/10	90/8	93/6	96/4	99/2	102/	104/10	107/8	110/6	113/4
35 „	78/9	81/8	84/7	87/6	90/5	93/4	96/3	99/2	102/1	105/	107/11	110/10	113/9	116/8

TABLE XXXII.—*Continued.*

WAGES CALCULATOR, per Day and per Hour.

1 week,	0/3	0/6	0/9	1/	1/6	2/	2/6	3/	3/6	4/	4/6	5/	5/6	6/
1 day,	0/0½	0/1	0/1½	0/2	0/3	0/4	0/5	0/6	0/7	0/8	0/9	0/10	0/11	1/
Day of 8 hours. hours. 1	0/0 1/16	0/0 1/8	0/0 3/16	0/0 1/4	0/0 3/8	0/0 1/2	0/0 5/8	0/0 3/4	0/0 7/8	0/1	0/1 1/8	0/1 1/4	0/1 3/8	0/1 1/2
2	0/0 1/8	0/0 1/4	0/0 3/8	0/0 1/2	0/0 3/4	0/1	0/1 1/4	0/1 1/2	0/1 3/4	0/2	0/2 1/4	0/2 1/2	0/2 3/4	0/3
3	0/0 3/16	0/0 3/8	0/0 9/16	0/0 3/4	0/1 1/8	0/1 1/2	0/1 7/8	0/2 1/4	0/2 5/8	0/3	0/3 3/8	0/3 3/4	0/4 1/8	0/4 1/2
4	0/0 1/4	0/0 1/2	0/0 3/4	0/1	0/1 1/2	0/2	0/2 1/2	0/3	0/3 1/2	0/4	0/4 1/2	0/5	0/5 1/2	0/6
5	0/0 5/16	0/0 5/8	0/0 15/16	0/1 1/4	0/1 7/8	0/2 1/2	0/3 1/8	0/3 3/4	0/4 3/8	0/5	0/5 5/8	0/6 1/4	0/6 7/8	0/7 1/2
6	0/0 3/8	0/0 3/4	0/1 1/8	0/1 1/2	0/2 1/4	0/3	0/3 3/4	0/4 1/2	0/5 1/4	0/6	0/6 3/4	0/7 1/2	0/8 1/4	0/9
7	0/0 7/16	0/0 7/8	0/1 5/16	0/1 3/4	0/2 5/8	0/3 1/2	0/4 3/8	0/5 1/4	0/6 1/8	0/7	0/7 7/8	0/8 3/4	0/9 5/8	0/10 1/2
1 week,	0/3	0/6	0/9	1/	1/6	2/	2/6	3/	3/6	4/	4/6	5/	5/6	6/
1 day,	0/0½	0/1	0/1½	0/2	0/3	0/4	0/5	0/6	0/7	0/8	0/9	0/10	0/11	1/
Day of 9 hours. hours. 1	0/0 1/18	0/0 1/9	0/0 1/6	0/0 2/9	0/0 1/3	0/0 4/9	0/0 5/9	0/0 2/3	0/0 7/9	0/0 8/9	0/1	0/1 1/9	0/1 2/9	0/1 1/3
2	0/0 1/9	0/0 2/9	0/0 1/3	0/0 4/9	0/0 2/3	0/0 8/9	0/1 1/9	0/1 1/3	0/1 5/9	0/1 7/9	0/2	0/2 2/9	0/2 4/9	0/2 2/3
3	0/0 1/6	0/0 1/3	0/0 1/2	0/0 2/3	0/1	0/1 1/3	0/1 2/3	0/2	0/2 1/3	0/2 2/3	0/3	0/3 1/3	0/3 2/3	0/4
4	0/0 2/9	8/0 4/9	0/0 1/3	0/0 8/9	0/1 1/3	0/1 7/9	0/2 2/9	0/2 2/3	0/3 1/9	0/3 5/9	0/4	0/4 4/9	0/4 8/9	0/5 1/3
5	0/0 5/18	0/0 5/9	0/0 5/6	0/1 1/9	0/1 2/3	0/2 2/9	0/2 7/9	0/3 1/3	0/3 8/9	0/4 4/9	0/5	0/5 5/9	0/6 1/9	0/6 2/3
6	0/0 1/3	0/0 2/3	0/1	0/1 1/3	0/2	0/2 2/3	0/3 1/3	0/4	0/4 2/3	0/5 1/3	0/6	0/6 2/3	0/7 1/3	0/8
7	0/0 7/18	0/0 7/9	0/1 1/6	0/1 5/9	0/2 1/3	0/3 1/9	0/3 8/9	0/4 2/3	0/5 4/9	0/6 2/9	0/7	0/7 7/9	0/8 5/9	0/9 1/3
8	0/0 4/9	0/0 8/9	0/1 1/3	0/1 7/9	0/2 2/3	0/3 5/9	0/4 4/9	0/5 1/3	0/6 2/9	0/7 1/9	0/8	0/8 8/9	0/9 7/9	0/10 2/3
1 week,	0/3	0/6	0/9	1/	1/6	2/	2/6	3/	3/6	4/	4/6	5/	5/6	6/
1 day,	0/0½	0/1	0/1½	0/2	0/3	0/4	0/5	0/6	0/7	0/8	0/9	0/10	0/11	1/
Day of 10 hours. hours. 1	0/0 1/20	0/0 1/10	0/0 3/20	0/0 1/5	0/0 3/10	0/0 2/5	0/0 1/2	0/0 3/5	0/0 7/10	0/0 4/5	0/0 9/10	0/1	0/1 1/10	0/1 1/5
2	0/0 1/10	0/0 1/5	0/0 3/10	0/0 2/5	0/0 3/5	0/0 4/5	0/1	0/1 1/5	0/1 2/5	0/1 3/5	0/1 4/5	0/2	0/2 1/5	0/2 2/5
3	0/0 3/20	0/0 3/10	0/0 9/20	0/0 3/5	0/0 9/10	0/1 1/5	0/1 1/2	0/1 4/5	0/2 1/10	0/2 2/5	0/2 7/10	0/3	0/3 3/10	0/3 3/5
4	0/0 1/5	0/0 2/5	0/0 3/5	0/0 4/5	0/1 1/5	0/1 3/5	0/2	0/2 2/5	0/2 4/5	0/3 1/5	0/3 3/5	0/4	0/4 2/5	0/4 4/5
5	0/0 1/4	0/0 1/2	0/0 3/4	0/1	0/1 1/2	0/2	0/2 1/2	0/3	0/3 1/2	0/4	0/4 1/2	0/5	0/5 1/2	0/6
6	0/0 3/10	0/0 3/5	0/0 9/10	0/1 1/5	0/1 4/5	0/2 2/5	0/3	0/3 3/5	0/4 1/5	0/4 4/5	0/5 2/5	0/6	0/6 3/5	0/7 1/5
7	0/0 7/20	0/0 7/10	0/1 1/20	0/1 2/5	0/2 1/10	0/2 4/5	0/3 1/2	0/4 1/5	0/4 9/10	0/5 3/5	0/6 3/10	0/7	0/7 7/10	0/8 2/5
8	0/0 2/5	0/0 4/5	0/1 1/5	0/1 3/5	0/2 2/5	0/3 1/5	0/4	0/4 4/5	0/5 3/5	0/6 2/5	0/7 1/5	0/8	0/8 4/5	0/9 3/5
9	0/0 9/20	0/0 9/10	0/1 7/20	0/1 4/5	0/2 7/10	0/3 3/5	0/4 1/2	0/5 2/5	0/6 3/10	0/7 1/5	0/8 1/10	0/9	0/9 9/10	0/10 4/5

TABLE XXXII.—*Continued.*

WAGES CALCULATOR, per Day and per Hour.

1 week,	6/6	7/	7/6	8/	8/6	9/	9/6	10/	10/6	11/	11/6	12/	12/6	13/
1 day,	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	2/	2/1	2/2
Day of 8 hours. hours.														
1	0/1 5/8	0/1 3/4	0/1 7/8	0/2	0/2 1/8	0/2 1/4	0/2 3/8	0/2 1/2	0/2 5/8	0/2 3/4	0/2 7/8	0/3	0/3 1/8	0/3 1/4
2	0/3 1/4	0/3 1/2	0/3 3/4	0/4	0/4 1/4	0/4 1/2	0/4 3/4	0/5	0/5 1/4	0/5 1/2	0/5 3/4	0/6	0/6 1/4	0/6 1/2
3	0/4 7/8	0/5 1/4	0/5 5/8	0/6	0/6 3/8	0/6 3/4	0/7 1/8	0/7 1/2	0/7 7/8	0/8 1/4	0/8 5/8	0/9	0/9 3/8	0/9 3/4
4	0/6 1/2	0/7	0/7 1/2	0/8	0/8 1/2	0/9	0/9 1/2	0/10	0/10 1/2	0/11	0/11 1/2	1/	1/0 1/2	1/1
5	0/8 1/8	0/8 3/4	0/9 3/8	0/10	0/10 5/8	0/11 1/4	0/11 7/8	1/0 1/2	1/1 1/8	1/1 3/4	1/2 3/8	1/3	1/3 5/8	1/4 1/4
6	0/9 3/4	0/10 1/2	0/11 1/4	1/	1/0 3/4	1/1 1/2	1/2 1/4	1/3	1/3 3/4	1/4 1/2	1/5 1/4	1/6	1/6 3/4	1/7 1/2
7	0/11 3/8	1/0 1/4	1/1 1/8	1/2	1/2 7/8	1/3 3/4	1/4 5/8	1/5 1/2	1/6 3/8	1/7 1/4	1/8 1/8	1/9	1/9 7/8	1/10 3/4
1 week,	6/6	7/	7/6	8/	8/6	9/	9/6	10/	10/6	11/	11/6	12/	12/6	13/
1 day,	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	2/	2/1	2/2
Day of 9 hours. hours.														
1	0/1 4/9	0/1 5/9	0/1 2/3	0/1 7/9	0/1 8/9	0/2	0/2 1/9	0/2 2/9	0/2 1/3	0/2 4/9	0/2 5/9	0/2 2/3	0/2 7/9	0/2 8/9
2	0/2 8/9	0/3 1/9	0/3 1/3	0/3 5/9	0/3 7/9	0/4	0/4 2/9	0/4 4/9	0/4 2/3	0/4 8/9	0/5 1/9	0/5 1/3	0/5 5/9	0/5 7/9
3	0/4 1/3	0/4 2/3	0/5	0/5 1/3	0/5 2/3	0/6	0/6 1/3	0/6 2/3	0/7	0/7 1/3	0/7 2/3	0/8	0/8 1/3	0/8 2/3
4	0/5 7/9	0/6 2/9	0/6 2/3	0/7 1/9	0/7 5/9	0/8	0/8 4/9	0/8 8/9	0/9 1/3	0/9 7/9	0/10 2/9	0/10 2/3	0/11 1/9	0/11 5/9
5	0/7 2/9	0/7 7/9	0/8 1/3	0/8 8/9	0/9 4/9	0/10	0/10 5/9	0/11 1/9	0/11 2/3	1/0 2/9	1/0 7/9	1/1 1/3	1/1 8/9	1/2 4/9
6	0/8 2/3	0/9 1/3	0/10	0/10 2/3	0/11 1/3	1/	1/0 2/3	1/1 1/3	1/2	1/2 2/3	1/3 1/3	1/4	1/4 2/3	1/5 1/3
7	0/10 1/9	0/10 8/9	0/11 2/3	1/0 4/9	1/1 2/9	1/2	1/2 7/9	1/3 5/9	1/4 1/3	1/5 1/9	1/5 8/9	1/6 2/3	1/7 4/9	1/8 2/9
8	0/11 5/9	1/0 4/9	1/1 1/3	1/2 2/9	1/3 1/9	1/4	1/4 8/9	1/5 7/9	1/6 2/3	1/7 5/9	1/8 4/9	1/9 1/3	1/10 2/9	1/11 1/9
1 week,	6/6	7/	7/6	8/	8/6	9/	9/6	10/	10/6	11/	11/6	12/	12/6	13/
1 day,	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	2/	2/1	2/2
Day of 10 hours. hours.														
1	0/1 3/10	0/1 2/5	0/1 1/2	0/1 3/5	0/1 7/10	0/1 4/5	0/1 9/10	0/2	0/2 1/10	0/2 1/5	0/2 3/10	0/2 2/5	0/2 1/2	0/2 3/5
2	0/2 3/5	0/2 4/5	0/3	0/3 1/5	0/3 2/5	0/3 3/5	0/3 4/5	0/4	0/4 1/5	0/4 2/5	0/4 3/5	0/4 4/5	0/5	0/5 1/5
3	0/3 9/10	0/4 1/5	0/4 1/2	0/4 4/5	0/5 1/10	0/5 2/5	0/5 7/10	0/6	0/6 3/10	0/6 3/5	0/6 9/10	0/7 1/5	0/7 1/2	0/7 4/5
4	0/5 1/5	0/5 3/5	0/6	0/6 2/5	0/6 4/5	0/7 1/5	0/7 3/5	0/8	0/8 2/5	0/8 4/5	0/9 1/5	0/9 3/5	0/10	0/10 2/5
5	0/6 1/2	0/7	0/7 1/2	0/8	0/8 1/2	0/9	0/9 1/2	0/10	0/10 1/2	0/11	0/11 1/2	1/	1/0 1/2	1/1
6	0/7 4/5	0/8 2/5	0/9	0/9 3/5	0/10 1/5	0/10 4/5	0/11 4/5	1/	1/0 3/5	1/1 1/5	1/1 4/5	1/2 2/5	1/3	1/3 3/5
7	0/9 1/10	0/9 4/5	0/10 1/2	0/11 1/5	0/11 9/10	1/0 3/5	1/1 3/10	1/2	1/2 7/10	1/3 2/5	1/4 1/10	1/4 4/5	1/5 1/2	1/6 1/5
8	0/10 2/5	0/11 1/5	1/	1/0 4/5	1/1 3/5	1/2 2/5	1/3 1/5	1/4	1/4 4/5	1/5 3/5	1/6 2/5	1/7 1/5	1/8	1/8 4/5
9	0/11 7/10	1/0 3/5	1/1 1/2	1/2 2/5	1/3 3/10	1/4 1/5	1/5 1/10	1/6	1/6 9/10	1/7 4/5	1/8 7/10	1/9 3/5	1/10 1/2	1/11 2/5

TABLE XXXII.—*Continued.*

WAGES CALCULATOR, per Day and per Hour.

1 week,	13/6	14/	14/6	15/	15/6	16/	16/6	17/	17/6	18/	18/6	19/	19/6	20/
1 day,	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	3/	3/1	3/2	3/3	3/4
Day of 8 hours. hours.														
1	0/3 3/8	0/3 1/2	0/3 5/8	0/3 3/4	0/3 7/8	0/4	0/4 1/8	0/4 1/4	0/4 3/8	0/4 1/2	0/4 5/8	0/4 3/4	0/4 7/8	0/5
2	0/6 3/4	0/7	0/7 1/4	0/7 1/2	0/7 3/4	0/8	0/8 1/4	0/8 1/2	0/8 3/4	0/9	0/9 1/4	0/9 1/2	0/9 3/4	0/10
3	0/10 1/8	0/10 1/2	0/10 7/8	0/11 1/4	0/11 5/8	1/	1/0 3/8	1/0 3/4	1/1 1/8	1/1 1/2	1/1 7/8	1/2 1/4	1/2 5/8	1/3
4	1/1 1/2	1/2	1/2 1/2	1/3	1/3 1/2	1/4	1/4 1/2	1/5	1/5 1/2	1/6	1/6 1/2	1/7	1/7 1/2	1/8
5	1/4 7/8	1/5 1/2	1/6 1/8	1/6 3/4	1/7 3/8	1/8	1/8 5/8	1/9 1/4	1/9 7/8	1/10 1/2	1/11 1/8	1/11 3/4	2/0 3/8	2/1
6	1/8 1/4	1/9	1/9 3/4	1/10 1/2	1/11 1/4	2/	2/0 3/4	2/1 1/2	2/2 1/4	2/3	2/3 3/4	2/4 1/2	2/5 1/4	2/6
7	1/11 5/8	2/0 1/2	2/1 3/8	2/2 1/4	2/3 1/8	2/4	2/4 7/8	2/5 3/4	2/6 5/8	2/7 1/2	2/8 3/8	2/9 1/4	2/10 1/8	2/11
1 week,	13/6	14/	14/6	15/	15/6	16/	16/6	17/	17/6	18/	18/6	19/	19/6	20/
1 day,	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	3/	3/1	3/2	3/3	3/4
Day of 9 hours. hours.														
1	0/3	0/3 1/9	0/3 2/9	0/3 1/3	0/3 4/9	0/3 5/9	0/3 2/3	0/3 7/9	0/3 8/9	0/4	0/4 1/9	0/4 2/9	0/4 1/3	0/4 4/9
2	0/6	0/6 2/9	0/6 4/9	0/6 2/3	0/6 8/9	0/7 1/9	0/7 1/3	0/7 5/9	0/7 7/9	0/8	0/8 2/9	0/8 4/9	0/8 2/3	0/8 8/9
3	0/9	0/9 1/3	0/9 2/3	0/10	0/10 1/3	0/10 2/3	0/11	0/11 1/3	0/11 2/3	1/	1/0 1/3	1/0 2/3	1/1	1/1 1/3
4	1/	1/0 4/9	1/0 8/9	1/1 1/3	1/1 7/9	1/2 2/9	1/2 2/3	1/3 1/9	1/3 5/9	1/4	1/4 4/9	1/4 8/9	1/5 1/3	1/5 7/9
5	1/3	1/3 5/9	1/4 1/9	1/4 2/3	1/5 2/9	1/5 7/9	1/6 1/3	1/6 8/9	1/7 4/9	1/8	1/8 5/9	1/9 1/9	1/9 2/3	1/10 2/9
6	1/6	1/6 2/3	1/7 1/3	1/8	1/8 2/3	1/9 1/3	1/10	1/10 2/3	1/11 1/3	2/	2/0 2/3	2/1 1/3	2/2	2/2 2/3
7	1/9	1/9 7/9	1/10 5/9	1/11 1/3	2/0 1/9	2/0 8/9	2/1 2/3	2/2 4/9	2/3 2/9	2/4	2/4 7/9	2/5 5/9	2/6	2/7 1/9
8	2/	2/0 8/9	2/1 7/9	2/2 2/3	2/3 5/9	2/4 4/9	2/5 1/3	2/6 2/9	2/7 1/9	2/8	2/8 8/9	2/9 7/9	2/10 2/3	2/11 5/9
1 week,	13/6	14/	14/6	15/	15/6	16/	16/6	17/	17/6	18/	18/6	19/	19/6	20/
1 day,	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	3/	3/1	3/2	3/3	3/4
Day of 10 hours. hours.														
1	0/2 7/10	0/2 4/5	0/2 9/10	0/3	0/3 1/10	0/3 1/5	0/3 3/10	0/3 2/5	0/3 1/2	0/3 3/5	0/3 7/10	0/3 4/5	0/3 9/10	0/4
2	0/5 2/5	0/5 3/5	0/5 4/5	0/6	0/6 1/5	0/6 2/5	0/6 3/5	0/6 4/5	0/7	0/7 1/5	0/7 2/5	0/7 3/5	0/7 4/5	0/8
3	0/8 1/10	0/8 2/5	0/8 7/10	0/9	0/9 3/10	0/9 4/5	0/9 9/10	0/10 1/5	0/10 1/2	0/10 4/5	0/11 1/10	0/11 2/5	0/11 7/10	1/
4	0/10 4/5	0/11 1/5	0/11 3/5	1/	1/0 2/5	1/0 4/5	1/1 1/5	1/1 2/5	1/2	1/2 2/5	1/2 4/5	1/3 1/5	1/3 3/5	1/4
5	1/1 1/2	1/2	1/2 1/2	1/3	1/3 1/2	1/4	1/4 1/2	1/5	1/5 1/2	1/6	1/6 1/2	1/7	1/7 1/2	1/8
6	1/4 4/5	1/4 4/5	1/5 2/5	1/6	1/6 3/5	1/7 1/5	1/7 4/5	1/8 2/5	1/9	1/9 3/5	1/10 1/5	1/10 4/5	1/11 2/5	2/
7	1/6 9/10	1/7 3/5	1/8 3/10	1/9	1/9 7/10	1/10 2/5	1/11 1/10	1/11 4/5	2/0 1/2	2/1 1/5	2/1 9/10	2/2 3/5	2/3 3/10	2/4
8	1/9 3/5	1/10 2/5	1/11 1/5	2/	2/0 4/5	2/1 3/5	2/2 2/5	2/3 1/5	2/4	2/4 4/5	2/5 3/5	2/6 2/5	2/7 1/5	2/8
9	2/0 3/10	2/1 1/5	2/2 1/10	2/3	2/3 9/10	2/4 4/5	2/5 7/10	2/6 3/5	2/7 1/2	2/8 2/5	2/9 3/10	2/10 1/5	2/11 1/10	3/

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